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REPORT of the SECRETARY of AGRICULTURE 1972

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Report of the Secretary of Agriculture 1972

ERRATA

Page 1--

Item 1 listed under second paragraph should read:

> Record net farm income of more than $19.2 billion was received during 1972. That surpassed the previous high set 25 years ago.

Item 4 listed under second paragraph should read:

> Agricultural exports set a new record of $7.8 billion in fiscal year 1971, and established another record year in fiscal 1972 of $8.1 billion.

Department of Agriculture
Washington, D. C.

The President
The White House
Washington, D.C.

Dear Mr. President:

It is my privilege to present to you this report entitled "A Year of Breakthroughs," an account of the services and programs rendered in 1972 by the U.S. Department of Agriculture to our farm and rural people and to the whole Nation.

The report shows breakthroughs and significant progress toward the Department's major goals.

As Secretary of Agriculture, I submit this report with pride in the dedicated service of the able public servants who work with me in the Department.

Sincerely,

Earl L. Butz

Earl L. Butz
Secretary of Agriculture

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May 1973

FISCAL YEAR 1972—A YEAR OF BREAKTHROUGHS

Each year since the industrial revolution, American agriculture has set new records, uncovered new information, and provided a more abundant life for the people of our Nation. In addition to feeding and clothing us better, America's farmers also produce enough to help millions of people in less developed countries around the world.

Fiscal year 1972 was clearly a year of breakthroughs with unprecedented progress and accomplishments in many areas. A 1972 progress report for American agriculture quickly produces these facts:

- Record net farm income of more than $18.8 billion was received during 1972. That surpassed the previous high set 25 years ago.
- The loss in number of farms was cut by more than 60 percent.
- For the first time in years, the cost-price squeeze on America's farmers eased a bit, as prices received gained on prices paid.
- Agricultural exports set a new record of $7.8 billion in fiscal year 1971, and appear headed for another record year in fiscal 1972 of $10 billion.
- The largest grain transaction agreement ever made in the world was completed July 8 with the Soviet Union, and more than 1 billion dollars' worth of wheat, feed grain, and oil seeds were purchased in the first year of the 3-year agreement.
- The level of farm prices reached an alltime high for many farm products.

Clearly a three-way agricultural breakthrough is taking place—in farmers' income prospects, in sales of farm commodities, and in market-oriented farm production.

A cardinal principle has been to lower inventories and to gear farm output to the opportunities of expanding markets. It is the principle written into the Agricultural Act of 1970 and the one now being applied to all commodity programs.

The results of these efforts are encouraging. Healthy shifts in cropping patterns are taking place—shifts which permit farmers to produce their most profitable products on their farms. Last year, enrollment of farms and acreage in the major programs—wheat, feed grains, and cotton—was the highest on record. And solid gains are being made in the all-important area of improved farm income.

BREAKTHROUGHS OF MANY FORMS

Most Americans could not enjoy the standard of living they now have were it not for the breakthrough in food production. Research into practical production basics, including mechanization, has led to an ever-mounting array of innovations. Good communications and education brought that know-how to farmers. Farm entrepreneurs, motivated by profit, adopted the innovations.

The breakthrough in food production was accompanied by a second breakthrough, one in food processing and distribution. For nearly a century the Department of Agriculture has contributed significantly to this activity.

Today the U.S. farmer produces more per man, per hour, per acre, and per unit of livestock than anyone anywhere else. He is the mainspring in the food clock of abundance. He has brought low-cost, high-quality food to America and to our neighbors around the world. Today's average farm operator feeds himself and 51 other people. Less than 25 years ago he was feeding only 15 people other than himself.

But the main reason for the driving force behind agriculture's contribution to living levels of all Americans stems from the fact that today's average consumer spends less than 16 percent of his take-home pay for food. This leaves the other 84 percent available for other items that contribute to his level of living. Nowhere else is this happening.

The agricultural breakthrough has freed manpower to produce nonfarm goods and services abundantly. Since less than 5 percent of Americans are needed to produce the Nation's food and fiber, the other 95 percent are available to provide the other things that comprise the way of life of most Americans today.

Farmers, too, are some of the Nation's biggest customers. Their assets exceed $250 billion; they spend over $40 billion yearly to cover production expenses; they pay annual property taxes in excess of $3 billion; and their debt load approximates $60 billion, a figure that will double by 1980.

Over and above all this, urban residents extract enormous bites of capital from rural America through the young people who leave the farm.

Because more than half of all farm-reared youth leave the farm and few farm parents deprive their nonfarm heirs of their share of the home farm assets, nonfarmers inherit over one-half of all farm assets (nearly $100 billion) every generation. This is a huge financial drain on rural America.

BREAKTHROUGH IN FARM MANAGEMENT SKILLS

It takes a capable farm manager, a man of many unusual skills, to run today's modern farm profitably. Gone are the days when "just anyone" could grub out a living on the land. Right decisions must be made or the operator quickly finds himself bankrupt.

The pressure that requires top flight farm management is one associated with high and rising investments and operating costs. Today's average farmer has nearly $100,000 invested in land and farm buildings—machinery, livestock and inventories, and working capital, not including the value of his residence. This figure has more than doubled in the past 10 years.

Also, annual farm production expenses continue to move steadily upward. For the Nation as a whole, they have now reached roughly $14,000 per year per farm.

As one might expect, today's farmer has a better education than he used to have. Today's average farm operator has 11.6 years of education; in 1964 the figure stood at 9.3 years.

One sobering impact of these trends is that today's farmer is over 51 years of age. Agriculture has not been sufficiently profitable for many young would-be farmers to risk it as a profession. If able young farmers stay out of agriculture in large numbers and age takes its toll among farm operators, food production will fall as demand is rising, sending food prices so high that farmers and consumers alike would be harmed. That is one reason why it is important that income to farmers be commensurate with that of nonfarmers facing similar risks, investment, and skills.

BREAKTHROUGHS IN FINANCING

During the past 30 years American agriculture has switched from a heavy labor-intensive industry to one relying increasingly on the use of large sums of borrowed capital.

During the past decade, and especially since the late 1960's, the country has recognized the necessity to upgrade living conditions in its rural communities, so as to reestablish a balance of opportunity for a good life in either a rural or urban environment.

In both situations, USDA has had a significant role through programs administered by its rural credit agency, the Farmers Home Administration (FHA). As farmers expand their operations, and their needs for additional capital continue to grow, family farmers who cannot get commercial credit often turn to FHA for help that will assure them a chance to suceed. In rural community development, bedrock programs to finance modernized housing and community water and waste disposal services have been centered in this agency.

The total value of FHA loans and grants has doubled in the past 3 years, reaching a new high of $2.785 billion in 1972, as compared to $1.417 billion in 1969. More than 3 million Americans benefited directly from Farmers Home Administration financing in 1972, as some 190,000 loans and grants were approved.

The most spectacular breakthrough by FHA has occurred in the field of rural housing. Total loans more than tripled in the past 3 years, reaching $1.618 billion in 1972. The greatest sum was used to construct individual family homes—some 110,000 the past year. The construction of good rental apartment housing in rural

communities also is in a stage of rapid growth. About 4,800 units of rental housing were built with $51 million secured from FHA during 1972.

In keeping with the Administration's goals for support of family agriculture, loans were made by FHA to more than 56,000 family farmers in 1972 to enable them to buy land; build necessary buildings and make other improvements; purchase equipment, livestock, and production supplies; and meet other expenses that would enable them to remain on the land and prosper.

Farm ownership loans to more than 13,000 borrowers totaled $349 million, and farm operating loans to some 43,000 farmers added $337 million.

Among the operating loan borrowers was 17-year-old Melvin Mitchell of Portales, N.Mex., a member of the Future Farmers of America. He used an 800-dollar loan to buy 10 feeder calves and feed to enable him to participate in a farm enterprise project. He is typical of many young farmers aided under an accelerated FHA effort to reach and put them on the track to successful farming.

In addition to its regular farm loan programs, FHA dispensed some $275 million in 38,000 emergency loans during 1972 to rectify damage caused by natural disaster and to restore farms to normal operation.

FHA's farm borrowers also benefited from more than $310 million in credit advanced by private lenders such as banks, savings and loan associations, and institutions of the Farm Credit System who were conceded first lien on property used as security simultaneously for FHA and non-FHA loans. In expanding its cooperation with other lenders, FHA in 1972 increased the value of its farm credit services to more than $1 billion a year for the first time in its history.

A basic foundation of the growing agricultural economy and of Americans' rising preference for life in a rural environment is the smaller community, where farmers market their crops and where the shopping and social services used by rural people are centered. One of the fundamental efforts is the Rural Community Facilities program carried on through the Farmers Home Administration. Under this program, more than 1,200 new rural community water and waste disposal systems were produced in 1972 with the assistance of some $300 million in loans and $40 million in grants from FHA.

The future looks bright for agriculture, and today's accomplishments will appear nominal when compared to achievements likely in the next few years.

We face great challenges in further expanding our agricultural exports beyond the record $10 billion expected this fiscal year. This will call for hard work with other countries on trade agreements and arrangements, but there are undreamed of possibilities for expanding our food exports in a peaceful world.

The rural population has yet to enjoy fully the economic uplift that blesses much of the Nation's population. Improvement in rural areas development will be an important area of opportunity during the next 4 years.

All Americans have a vital interest in open space, land use, water, recreational opportunities, and sound development of natural resources. They also have a vital stake in the task of continuing to produce an abundance for all while treating our environment with respect, concern, and understanding, so that it can continue to provide us with healthful living opportunities for ourselves and coming generations.

Farmers have made important gains in recent years. Farm products have remained competitive in trade overseas and at home, which has expanded markets dramatically and has brought farmers more income from the market. Throughout it all, farmers have remained the most productive major segment in our entire economy and a real marvel in the world.

A STRONGER AGRICULTURAL ECONOMY

The age-old farm problems of inadequate income and ever-increasing production expenses moved closer to acceptable solutions in 1972. Gross and net farm income reached alltime highs. Expanded sales of farm goods abroad accounted for a major portion of the improved income, with shiploads of grains and oilseeds building bridges to world peace and prosperity at home on the farm.

The breakthrough in farm income came in several ways. Total gross farm income, total net farm income, gross and net income per farm, and total income per farm resident were all higher in 1972 than ever before. But we must do better. We must continue our efforts to improve farm income until the income of farm people reaches a level comparable to that of nonfarm people. Currently, farm people earn just 83 percent as much as nonfarm people, but this is up from 55 percent in 1960.

Farmers should be able to earn a return for their labor, investment, management skill, and risk which is equal to returns in other segments of the economy. Solid progress toward this breakthrough was made in 1972 when net farm income reached $19.2 billion, up over $3 billion from 1971, breaking the old record of $17.1 billion set 25 years ago.

At the end of the year farm prices were 23 percent above average farm prices in 1968.

RECORD AGRICULTURAL DEMAND

Unprecedented demand for the output of America's farms has placed the Nation's agricultural economy in a favorable position. With more mouths to feed and living levels rising for most Americans, the domestic demand for food increased moderately during 1972, but it was the spiraling demand for America's agricultural products abroad that dominated the economic picture.

Now, more than ever, American farmers are producing for world markets. More people everywhere are getting more income. And most of them are not eating nearly as well as we do. Yet, like Americans, they are eager to upgrade their diets, thus providing profit opportunities for U.S. farmers and ranchers who have a clear technological advantage over food and fiber producers in most other countries.

The value of agricultural exports this fiscal year will reach a record of $10 billion, up a significant $2 billion from the record set in 1971. Only one-half of this remarkable increase is due to the

breakthrough in export sales of wheat, feed grains, and soybeans to the Soviet Union.

Consumers meanwhile will spend a smaller proportion of their spendable dollars on food this year than ever before.

Farm profits increased in 1971, when 90 percent of U.S. farmers participating in the wheat, feed grain, and cotton programs took advantage of the flexibility provided in the programs to either overplant or underplant their historic allotments or bases. These shifts to more profitable crops accelerated during 1972 when the percentage rose to about 95 percent.

Overplanting and underplanting tended to balance each other, as corn and soybeans replaced such low-return crops as oats and rye in the Corn Belt, wheat replaced oats and rye in the Great Plains States and the Pacific Northwest, and cotton producers leased allotments across county lines. Production was thus transferred to areas where crops can be grown more efficiently. Cotton transfers also allowed some operators to increase the size of their operations so that they could make more efficient use of machinery, manpower, and capital resources. Soybeans and cattle production meanwhile moved into many of the areas from which cotton allotments were leased.

The importance of these cropping shifts to the individual farmer has been demonstrated by a Nebraska producer who stopped raising soybeans 2 years ago because he could make more money with irrigated corn in that particular area. "Each farmer needs to raise the crop that he can make the most money on," is the way he put it.

An Illinois producer said: "A farmer is in business to supply the crops required to meet the world's needs. With the set-aside program, we're able to adjust our individual operations to meet worldwide needs."

Extent of the shifts toward market orientation for agriculture is shown by the fact that across the Nation, corn farmers planted 3 million more acres of soybeans in 1972 than they did in 1971. This is a crop with strong export demand.

Today soybeans are this country's biggest cash crop and its hottest farm export item. Four years ago, soybean sales were stagnant and nearly a third of our production was piling up in storage bins unsold. By removing acreage controls from other major crops and setting the soybean support price at market-stimulating levels, we injected new vitality into the soybean industry. Today the worldwide demand for this protein-rich commodity is growing, average soybean prices received by farmers are the highest on record, and we need more production. Soybeans are a prime example of an expanding agriculture—the course we all want our farm economy to take.

FARM INCOME

Several breakthroughs have contributed to the current upward thrust in farm income.

- Efforts to calm the inflationary swing in farm costs.
- Effective programs to prevent anyone from facing the necessity of going to bed hungry.
- A spectacular dawning of a new climate for international relations. This climate is conducive to peace and mutually advantageous exchanges, enabling U.S. farmers to capitalize on their competitive advantage in the marketplaces of the world.
- U.S. farm programs to enable farmers and ranchers to adjust more readily to the dictates of the marketplace, both at home and abroad.

Total Farm Earnings

Total earnings of the farm population from all sources, farm and nonfarm, reached a record $33.2 billion in 1972. Income was higher from both sources in 1972 than in 1971; income from farm sources was up about 13 percent while that from nonfarm sources, principally nonfarm wages and salaries, was up about 12 percent.

In spite of the fact that the income of farm people has not caught up with that of nonfarm people, it is encouraging that farm people have realized more rapidly rising incomes in recent years than nonfarm people. The following table shows comparative income data.

	1971	*1972**
	Mil. dol.	*Mil. dol.*
Realized gross farm income	60,057	66,445
Farm production expenses	44,006	47,200
Realized net income of farm operators (realized gross income minus expenses)	16,051	19,245
	Dollars	*Dollars*
Realized net farm income per farm	5,581	6,797
Disposable personal income per capita		
Farm population, all sources	2,832	3,179
Nonfarm population, all sources	3,632	3,837
Farm as percentage of nonfarm	78.0	82.9

*Preliminary

Total Income of Farm Operator Families

Besides their net earnings from farming, farm operator families shared about $17.9 billion from off-farm sources—wages, dividends, rents, business profits, and so forth in 1971. This off-farm income averaged $6,230 per farm operator family.

The combined farm and off-farm net income averaged $11,811 for 2.9 million farm operator families in 1971. That figure was

about $130 higher than that in 1970 and about $870 higher than the figure in 1969.

In 1971, the portion of total earnings that came from farm and off-farm sources varied with the size of farm (in volume of product sales) as is seen in the following table.

Value of products sold per farm	Number of farms	Income per operator family from		Total
		Farming	Off-farm sources	
1,000 dollars	Thousands	Dollars	Dollars	Dollars
$40,000 +	253	27,289	6,447	33,736
20,000 - 39,999	365	9,721	3,825	13,546
10,000 - 19,999	392	6,026	3,676	9,702
5,000 - 9,999	385	3,397	5,221	8,618
2,500 - 4,999	409	1,993	5,743	7,736
Under 2,500	1,072	1,039	8,479	9,518
Total or average	2,876	5,581	6,230	11,811

On the average, farm operator families in *all* size classes of farms have substantial off-farm income. Off-farm income is especially important to the operators of the smaller farms, those who sell less than 10,000 dollars' worth of products. Among such farms the total income (farm plus off-farm) of farm operator families averaged $7,700 to $9,500.

A growing number of the Nation's people are indicating a preference for living in rural areas. Additional off-farm income is necessary for many of these families. Agricultural economists at the University of Minnesota have prepared an analysis showing that living costs may be higher in the country than in the city. Although housing costs in rural areas are lower than those in the city, these areas often lack social services, health facilities and personnel, post-high school educational opportunities, and a range of consumer goods. Rural stores cannot offer city discount prices.

PRODUCTION AND SUPPLIES

Farm production climbed to another new high in 1972, as both livestock and crop output expanded by 1 percent. Farmers used about 2 percent fewer acres than in 1971, but yields reached a new record.

Farm production per man-hour continued to move upward. Each farm worker in 1972 supplied enough food and fiber for close to 51 persons—43 persons at home plus eight abroad.

Through the Statistical Reporting Service, a national survey was conducted to determine the current level of farm production expenses. The last such survey was conducted in the mid-1950's,

and many of the production item weights used in computing the parity index are seriously in need of updating. The survey covering 1971 farm production expenses will provide information to update the level of production expenses, and will provide data that should lead to a more accurate measure of net farm income. The launching of the production expenditure survey will also provide the means to obtain information that will permit the farm expenditure items to be evaluated annually. This represents a signficant breakthrough, permitting changes in farm production expenses to be properly evaluated on a current basis.

Food Prices, Consumption, and Expenditures

The retail food price index increased more than 4 percent in 1972. This was larger than last year's increase but smaller than increases in 1969 and 1970. A major cutback in pork supplies and strong demand for beef, brought about by higher personal incomes, contributed to the 1972 increase. Fish prices also advanced noticeably, but fell short of the record gain in 1971. Advances for dairy products and poultry were minimal, reflecting more abundant supplies. Egg production eased during 1972, and prices, although depressed during much of the year, increased sharply in the closing months. Fresh produce prices were up approximately one-half of last year's advance, although potato prices showed a sharp recovery from depressed levels of recent years. Cereal and bakery products advanced more than in 1971, reflecting higher wheat prices, and a rise in coffee prices boosted the beverage price index.

Expenditures for food totaled $123.5 billion in 1972, 5 percent above expenditures a year ago. The gain primarily reflected increased prices, as per capita food consumption was down slightly. With incomes rising at a faster pace than food expenditures, the percentage of disposable income spent for food fell to 15.5 percent.

Meat and Eggs

Prices received by farmers for livestock were substantially higher in 1972 than in 1971. The average farm price of cattle was over $4 per 100 pounds, hog prices jumped an average of $8.50 per hundredweight, and lamb prices were $3 higher. The average price of broilers and turkeys was slightly higher for the year. Egg prices averaged close to 1971 levels.

Dairy

Cash receipts to farmers from the sale of milk and cream exceeded $7 billion for the first time in history, up from $6.8 billion in 1971 and $5 billion in 1965.

Wheat

Since 1969 the U.S. average yield of wheat per harvested acre has been above 30 bushels. In the preceding 15 years it had ranged between 20 and 30 bushels. Before 1956 it had been below 20 bushels for many decades.

Wheat supplies for 1972-73 totaled 2.4 million bushels, 3 percent above last year's large supplies. Total disappearance is estimated at 1,942 million bushels, a fifth above the previous record in 1965-66 and well above the indicated 1972 crop of 1,545 million bushels. Prospective utilization suggests a carryover of 483 million bushels at the end of the 1972-73 season, the smallest since July 1967.

Unprecedented world demand and tightening restrictions on exportable wheat supplies outside the United States have brought about sharply higher U.S. wheat export prospects for 1973—a record 1,150 million bushels compared with 632 million in 1971-72.

Cotton

The U.S. average yield of cotton in 1972 was 495 pounds of lint, sharply above 1971's 438 pounds, and moderately above the 1966-70 average of 463 pounds per harvested acre.

The 1972 cotton crop is estimated at around 13.6 million bales, about 3 million above the 1971 crop. Higher prices for U.S. cotton during 1971-72 weakened demand, particularly by foreign mills. Exports declined about ½ million bales to 3-1/3 million, as competitive foreign supplies expanded. U.S. mill use remained near the previous year's 8.1 million bales.

The increase of 29 percent in the 1972 cotton crop means that this season's supply will increase nearly 2½ million bales above the 14¾ million bales in 1971-72, which was the smallest supply since 1947. Last August's carryover of 3.4 million bales was the smallest since 1952. However, stocks may increase to a more normal level of about 5 million bales by next summer, as disappearance, although a little higher this year because of larger expected exports, falls short of this year's crop.

Tobacco

The 1972 tobacco crop totaled 1.7 billion pounds, 2 percent above that of 1971. Both harvested acreage and yields increased slightly over that of 1971. Prices for the 1972 flue-cured crop averaged about 85.3 cents per pound, compared with the 77.2 cents per pound received in the 1971-72 season.

Feed Grains

On balance, the 1972-73 feed grain supply will almost equal last year's supply. Domestic use will increase about 2 to 3 percent.

Exports are projected to rise 5 to 10 percent, which would be close to the record volume moved overseas during 1965-66. Disappearance of about 196 million tons would exceed indicated production, bringing a moderate drop in carryover at the end of the 1972-73 marketing year.

Feed grain prices received by farmers during 1972-73 will average more than those in 1971-72.

Soybeans

During the 1971-72 marketing year, soybean prices exceeded the $3 per bushel level for the first time in nearly a quarter of a century. The $3.01 season average received by farmers topped the previous year's average by 16 cents per bushel, and was well above the support price of $2.25. Limited soybean supplies and strong demand for soybeans and soybean meal were major factors in the sharp increase.

Soybean supplies for 1972-73 are estimated at 1,348 million bushels, about 6 percent above supplies last year. Demand is strong, and usage is expected to approximate the 1972 production of 1,276 million bushels. As a result, carryover stocks next fall again will be at minimum operating levels. Soybean prices—already at record levels—will probably rise more, and for the season may average as much as 25 percent above the $3.01 per bushel of 1971-72.

Timber

The volume of timber harvested in fiscal year 1972 totaled 11.7 billion board feet with gross proceeds of approximately $330 million. This was up 1.4 billion board feet from fiscal year 1971's output of 10.3 billion board feet. The 1972 harvest was 0.4 billion board feet below the record volume of 12.1 billion board feet attained in fiscal years 1966 and 1968.

Corn

The year 1972 was a year of breakthrough in corn yield. That year (forecasted average yield of 94.5 bushels per harvested acre for grain) was the first time the average national yield topped 90 bushels. For 3 years before, it ranged between 80 and 90 bushels, and the 4 years before that it averaged 70 to 80 bushels. The following tabulation shows the increase in U.S. average annual yield of corn since 1952.

Years	Yield range (bushels)	Annual yields (bushels per acre)					
1972	90	94.5					
1969-71	80-89	85.9	71.6*	86.8			
1965-68	70-79	74.1	73.1	80.1	79.5		
1961-64	60-69	62.4	64.7	67.9	62.9		
1958-60	50-59	52.8	53.1	54.7			
1952-57	40-49	41.8	40.7	39.4	42.0	47.4	48.3

*Corn blight.

U.S. corn yield has more than doubled in about two decades. The 1980 projected yield of more than 100 bushels seems entirely reasonable, and it may reach that level before then.

Grain Sorghum

Since 1965, the average yield of sorghum grain has been above 50 bushels an acre. In the 4 years before, it ranged between 40 and 50 bushels. In the 3 years before that, it ranged between 30 and 40 bushels. Before 1958 it was below 30 bushels.

Rice

U.S. rice yields have ranged above 4,000 pounds an acre since 1964, ranged between 3,000 and 4,000 pounds from 1955 through 1963, and were below 3,000 pounds before 1955.

PROTECTION AGAINST NATURAL DISASTER

Providing assistance to farmers in time of natural disaster is a major responsibility of the Department of Agriculture.

The only Federal agency making loans to restore farm operations damaged by storm, flood, or other catastrophe is USDA's Farmers Home Administration. Insurance of crops against loss through natural disaster is provided by the Federal Crop Insurance Corporation. Other programs of emergency assistance based on the use and conservation of resources are carried out by the Agricultural Stabilization and Conservation Service.

Emergency Loans

Flood, drouth, hurricane, and other natural disasters took more than their normal toll during 1972. The most costly floods on record in the United States occurred in June in Pennsylvania, New

York, Virginia, and adjacent eastern seaboard States as a result of Hurricane Agnes. In this and other areas of 36 States and Puerto Rico, the ravages of weather caused 879 counties and 31 independent cities to be certified as eligible for farm emergency and rural housing disaster loans from the Farmers Home Administration under liberalized loan terms passed by Congress in 1972.

The new legislation relaxed previous requirements that emergency loan applicants prove their need for credit and their inability to get a loan from a lender other than FHA. Borrowers also were exempted from paying back the first $5,000 of an emergency loan, and were charged only 1 percent interest on any additional amount repayable. Under these lenient new terms, FHA's emergency loan total mounted to a record $275 million in 1972. Loans the last 6 months of the year alone totaled about $210 million, far exceeding the budget of $135 million originally available for emergency loans in all of fiscal 1973.

Confronted with this overrun on the budget, the Administration was forced to act in late December to curtail the emergency loan program. FHA was directed to help more farmers recover from disaster losses by serving them with regular farm operating loans, which are made on the basis of need and unavailability of other credit resources.

Crop Insurance Against Disaster

Protection against loss caused by natural disaster to farm crops is the major thrust of the Federal Crop Insurance Corporation program. Farmers have the promise of a more sound insurance program and improved service in the future because of the breakthroughs FCIC witnessed during 1972.

Strong indication of the improving soundness in the insurance operation that is under way is reflected by the currently estimated 1972 loss ratio of 0.61, whereby 61 cents of each premium dollar was used to pay indemnities. Indemnities totaling $25,600,000 were estimated to be paid on 854 billion dollars' worth of protection (premiums totaled $42 million) provided for the insured farmers. In 1971 Federal crop insurance premiums exceeded the indemnities paid by the highest amount in the FCIC's history to that point—$19,516,000 with a 0.59 loss ratio.

Despite the estimate of improvement in the total insurance operation, 1972, like every other year, provided graphic illustrations of the risks and uncertainties farmers face each year in their efforts to realize a profit in producing the Nation's food and fiber. Thousands of corn, cotton, and soybean farmers with bumper crops nearing the harvesting stage watched helplessly in 1972 as potentially high profit crops deteriorated and spoiled in fields too wet from continuing rains to support harvesting equipment. Of the 21 crops insured with widely varying amounts of liability, six will require more than their 1972 premiums to pay the insurance

indemnities. These are apples, cotton, grapes, oats, peaches, and tomatoes.

In addition to over $25 million of indemnities paid to farmers suffering severe crop losses in 1972, the Federal Crop Insurance Corporation contributed significantly to a stronger agricultural economy by providing additional security to obtain needed financing. The $854 million of FCIC protection added to the other collateral farmers were required to provide to meet the financing requirements of increasing production costs.

Significant breakthroughs in 1972 in FCIC's operations were the Corporation's progress in initiating and expanding establishment of individual farm coverages based more directly on the farmer's production record, and providing higher coverage for insured farmers meeting specified cultural practices. These improvements obviously have great potential for adding to the strength of the agricultural economy in future years. They will help expand the number of acres on which the money invested will be protected against loss from risks beyond the farmer's control, such as the excessive moisture conditions in 1972, which made it impossible to harvest many bumper crops.

Emergency Assistance Programs

The Agricultural Stabilization and Conservation Service helps farmers who are hit by natural disasters. ASCS administers the Emergency Livestock Feed Grain Program and a program to grant emergency grazing and haying privileges on cropland taken out of production.

Under the Emergency Livestock Feed Grain Program, ASCS makes available Government-owned feed grain at reduced prices. The feed grain is made available in designated emergency areas where the Secretary of Agriculture determines there is a shortage of livestock feed because of natural disasters such as flood, drouth, fire, and hurricane.

When the President declared Hurricane Agnes a major natural disaster in six States, ASCS donated feed for livestock in two New York counties where stray animals were comingled and ownership could not be determined. In addition, the Secretary of Agriculture declared the six States disaster areas. Under regular assistance programs, CCC-owned livestock feed grain was made available to eligible farmers at reduced prices.

During 1972, 179 counties in 12 States were approved for emergency aid under this program. Policies were revised in 1972 to make the program more beneficial to needy livestockmen.

Following a natural disaster which severely affects the normal supply of hay and pastureland, ASCS State committeemen may grant grazing and haying privileges on feed grain, wheat and cotton set-aside, or cropland conversion acreage. Formerly such authorization came from Washington. During 1972 more than 500 counties in 36 States were approved for this program.

Emergency Conservation Measures

ASCS is authorized to allocate funds to help farmers and ranchers meet emergency conservation problems caused by disaster in a given area. These include practices to control wind and water erosion and to rehabilitate farmland damaged by wind and flooding. Such emergencies may result from flood, drouth, fire, hurricane, earthquake, storm, and other catastrophes. ASCS shared with farmers up to 80 percent of the cost of these measures.

In 1972 more than $6.8 million was authorized for emergency conservation measures in 18 States. This $6.8 million in emergency aid did not include assistance to States and counties affected by Hurricane Agnes in mid-June. In 15 of the 18 States, damage was from flooding. Tornados, fire, and freezing accounted for damage in the other States.

As 1972 ended, about $12.25 million had been allocated for emergency conservation measures in 170 counties in Maryland, New York, North Carolina, Pennsylvania, Virginia, and West Virginia. These areas sustained severe damage from Hurricane Agnes.

A project where cost-sharing of emergency conservation measures was approved was one involving repair and replacement of a large drainage ditch. Eight producers cooperated and the total cost of the project was $200,741. Cost shares approved amount to 80 percent of the cost or $160,593.

As a result of the experience in Hurricane Agnes, program regulations covering emergency conservation measures were amended to increase from $2,500 to $5,000 the amount county committees might approve for one individual without State committee concurrence. The regulations were further amended to provide for approval of cost-sharing for removing of debris from farmsteads and roadways on the farm. Formerly only farmland was eligible for this program.

National Flood Insurance

ASCS also alerts affected farmers to the availability of national flood insurance. The ASCS county office notifies the individual farmer by mail when his community has been designated as eligible for flood insurance by the Department of Housing and Urban Development.

Disaster Program Coordination

ASCS provides certain emergency preparedness services for USDA. This includes leadership and service for the USDA State and county emergency boards—almost 3,000 people. These boards are the medium through which USDA mobilizes its field forces for defense and major disaster preparedness. Board members represent

USDA agencies with offices in the field. Boards maintain liaison with State or county government agencies having defense and disaster responsibilities, and coordinate USDA defense and major natural disaster programs within their geographic areas. The boards in the States affected were particularly helpful during Hurricane Agnes.

Weather-Crop Service Centennial

The 100th anniversary of a unique service to agriculture was marked in 1972. Weather and crop condition summaries used by producers, processors, and marketers appear in the Weekly Weather and Crop Bulletin, published as a cooperative effort of USDA's Statistical Reporting Service and the Department of Commerce's National Oceanic and Atmospheric Administration. Certificates of appreciation were presented to individuals representing the thousands of crop reporters, extension agents, and weather observers who voluntarily supply information for the bulletin.

DEVELOPMENTS IN AGRICULTURAL MARKETING

In 1972, the United States continued to make significant breakthroughs in the marketing of farm products.

Out of every $10 the consumer spends in retail stores for U.S. farm-grown food, $6 pays for marketing—which includes everything done with food between the farm and the store. It follows that the already efficient agricultural marketing system, because of sheer size, holds the greatest potential for improving the Nation's well-being through further gains in productivity.

Moreover, a market is the signal point for communicating to producers the ever-changing wants of their customers. Marketing services of the U.S. Department of Agriculture in 1972 facilitated the record volume of farm exports that helped stem the outflow of U.S. dollars and improved our relationships with Communist nations. They also provided data useful to farm producers in planning their production to meet market demands, as well as in planning their marketing of agricultural products.

Egg Products Inspection

The Egg Products Inspection Act, which became effective during 1972, is a breakthrough in the fight against a steady rise of human infection from salmonella organisms. It will help eliminate one of many sources of this group of bacterial diseases.

In February 1972, the Act was amended to provide that an oral hearing not be held in a reparation proceeding unless the amount claimed as damages exceeds $3,000, and to provide that the winner in a reparation case be allowed reasonable fees and expenses

incurred in connection with the hearing. Annual license fees were raised from $60 to $75 and new ground rules were laid as to the procedure the buyer and seller must take to extend the normal 10-day period for prompt payment.

Federal Seed Act

The Federal Seed Act protects not only farmers but gardeners and the seed trade as well by requiring that all seed sold in interstate trade be labeled completely and truthfully. Laws in all 50 States are complemented by the Act. As a result, States last year reported some 1,000 apparent violations to USDA for investigation and possible action.

Plant Variety Protection Act

The Plant Variety Protection Act of 1970 is an incentive to producers of new seed-borne varieties of plants because it protects the work, money, and time they may invest in a creation.

During fiscal year 1972, a plant variety protection office was staffed, a plant variety protection board established, and regulations were drafted. Plans were laid for the essential job of searching out and recording existing varieties in computer memory banks for quick comparison with new applications. And plans were also drafted for issuance of an official journal to describe new patents as they are issued.

By the end of June, 259 applications for plant variety protection had been received. Protection was sought for 55 kinds of agricultural, vegetable, and flower seeds.

Federal-State Marketing Improvement Program

USDA provides financial and technical aid to State departments of agriculture to expand farm markets and farm profits under the Federal-State Marketing Improvement Program. The States work with local and statewide commodity groups to promote stronger domestic and export demand for farm products and help local producers and marketing agencies bring about greater efficiency in food distribution.

Selling graded feeder pigs made a big difference to Tennessee pig producers in 1972. They received $1.4 million more than they would have received if the pigs had not been sold at graded sales. The Tennessee State Department of Agriculture helped organize the graded sales with financial assistance provided by the Federal-State Marketing Improvement Program.

Improvement in Data Transmission

To speed up the submission of reports from State statistical offices to Washington, D.C., and to help provide users with more timely crop and livestock reports, a facsimile network was installed in 26 field locations. This service is designed to insure that major crop and livestock reports reach local users within a few hours after the national report is released in Washington. This network along with EDP terminals, wired to computers for remote entry processing, is enabling the agency to process and release crop and livestock reports earlier so farmers and ranchers can take maximum advantage of the marketing opportunities to them.

Market News

Bostonians go in big for squash, New Yorkers have a "romance" going with cheese, and nearly every American wants more and better meat on his plate. Getting these foods and other agricultural commodities distributed across the country to the right place at the right time is one of the dynamic success stories of American agriculture.

The Federal-State Market News Service helps make this modern miracle possible. Market news reporters keep track of prices, supplies, and market conditions in all major producing areas and receiving markets throughout the country. Their daily, weekly, and monthly reports help producers, processors, wholesalers, and retailers decide when and where to buy and sell. The reports also help cargo transport carriers marshal rail, highway, air, and water transportation for systematic and efficient distribution of agricultural products where they are needed.

Market news information is provided by telephone, newspapers, radio, television, and through mailed reports. Automatic telephone answering devices in many cities are helping make market news available 24 hours a day. They also substitute for the reporter, who can tape information for answering devices in cities many miles from his office, thus providing even wider coverage at less cost for the person needing the information.

Significant growth in the reporting system, which exemplifies how market news supports and strengthens the agricultural economy, took place in 1972. For example, a new daily market summary for slaughter lambs, lamb carcasses, and wool, begun in August, helps the producer and meat packer get together on prices and supplies, with each having a fair opportunity to know what the going rate and the supply situation is.

Another new report covering supplies of eggs on hand at the beginning of each week in 21 leading egg-producing States gives the egg industry a good indication of prices that can be expected.

The opening of a market news office in the Red River Valley area of Minnesota and North Dakota this year means all major potato-growing areas are now covered. Producers can quickly see

what their competition is throughout the Nation, and buyers can more readily choose their suppliers.

Marketing Guides

Producing twice as much of a good agricultural product isn't the same as doubling production of a toy or other consumer product; people can eat only so much food. But it's difficult for the many independent vegetable, egg, turkey and broiler producers to decide each year how much they should produce to supply consumers' needs and still maintain a decent income.

To help these producers balance supplies with consumer demands, USDA develops marketing guides. After careful study of the market situation, and consultation among economists who specialize in various aspects of poultry or vegetable production and marketing, USDA publishes guides to advise producers on how much they should grow or plan to market.

So that consumer interests might be better represented, this year a staff member of the Office of the Special Assistant to the President for Consumer Affairs began taking part in meetings to discuss vegetable guides.

Marketing Agreements and Orders

In any marketing system where supply and demand cannot be greatly influenced by the individual producer, additional means may be needed to ensure orderly marketing. Thus, through the years, farmers have united through marketing agreements and orders to solve a wide range of marketing problems and strengthen their position in the economy. During fiscal year 1972 several meaningful achievements were realized under these programs. At the end of June, 49 marketing agreement and order programs were in effect for fruits, vegetables, and specialty crops. Commodities covered by these programs were worth $.23 billion at the farm. Marketing agreements and orders are administered locally by committees of growers or growers and handlers.

Considerable attention and activity continued to be focused on the Florida tomato marketing order program. A 5-week hearing was held in the fall of 1971 to reevaluate the program and procedures for regulating Florida tomatoes shipped to market. In the spring of 1972, USDA recommended that the marketing order which sets restrictions on the sizes of tomatoes moving to market by requiring different minimum sizes for different maturities of tomatoes not be changed. USDA determined from hearing evidence that the present order is an appropriate method of regulating shipments.

The Federal milk order program regulates an increasing proportion of the Nation's total milk output. Over 80 percent of the grade A milk supply came under the program during the year.

About 70 percent of the U.S. population now lives within the geographical boundaries of 62 milk markets. As a result, dairy farmers marketed 4.2 billion dollars' worth of milk under these orders during 1972.

One of the more important attributes of the Federal milk order program is its ability to change and adapt to a rapidly changing industry. Many of the actions taken in the past year reflect the widening scope of operations by both producers and handlers.

In fiscal year 1972 large dairy cooperatives continued to grow. This trend is expected to accelerate the consolidation of Federal milk orders. The recent formation of several large milk cooperatives in New England may pave the way for merger of the large Boston regional and Connecticut markets.

Processors too have recognized the economies associated with large, centralized operations. Some large regional and national supermarket chains now have, or are planning, large centralized bottling and distribution plants to supply their stores in several marketing areas. Also, numerous processors have integrated into retailing by opening chains of dairy convenience stores.

Market Research and Promotion

Another program aimed at expanding domestic and foreign markets and increasing farm prosperity is the research and promotion order. A secondary benefit that stems from the program is that the funds collected may be used for research in insect, disease, and weed control, as well as on quality improvement; mechanization; and processing, marketing, and development of improved products. In 1972, there was progress in self-help programs for increasing consumption of cotton, wheat, potatoes, and milk.

Potato growers approved a National Potato Research and Promotion Plan, which provides for a national program of research, development, advertising, and promotion designed to strengthen the demand for potatoes and potato products. The program is being financed by an assessment of 1 cent per hundredweight of potatoes handled, but a producer who does not wish to participate may obtain a refund. The program is just now becoming operational.

During fiscal year 1972, USDA and the National Wheat Institute entered an agreement to implement a wheat research and promotion program, using $2 million in unclaimed funds from a 1968 Commodity Credit Corporation export program. The agreement was approved. The Institute, with USDA's approval, will issue contracts to State and private organizations to work out appropriate projects to expand uses of wheat and wheat products.

Dairy farmers also made a breakthrough in fiscal year 1972 with establishment of their first advertising and promotion program under a federal milk marketing order in the Middle Atlantic milk market. By January 1, 1973, similar programs had become effective

in 15 other markets, and plans were underway for similar programs in 7 more markets.

The stalwart of all agricultural research and promotion efforts is the program for cotton and cotton products, now 6 years old. The program, carried out by Cotton Incorporated, encourages consumers and manufacturers to buy and use more cotton. During the fiscal year, efforts were concentrated on encouraging mills to use more cotton, and increasing consumer advertising to encourage more people to buy cotton products.

Three major projects were started under the cotton research and promotion program during the year. They are the following:

- Joint research with State and Federal agencies for finding a way to eradicate cotton's number one enemy, the boll weevil. The research includes a search for chemical, biological, and cultural pest control techniques which will enable farmers to greatly reduce the use of pesticides.
- Development and field tests of two new mechanized systems for handling and storing seed cotton in the field. This could save anywhere from $10 to $20 per bale.
- Initiation of intensified research on all aspects of byssinosis, the brown lung disease affecting textile workers.

Section 32 Purchase Programs

When supplies of a commodity are so abundant that they cannot be sold for adequate prices in normal market outlets, USDA, with funds authorized by Section 32 of the Act of August 24, 1935 (PL 74-320), can help relieve the pressure on prices through purchase, diversion, or export programs. Purchase programs are the most widely used. These purchases help others besides producers because one of the purposes of the act is to improve the diets of school children and needy persons, as well as to help growers maintain economic stability.

In fiscal year 1972, USDA bought 975 million pounds of food for distribution to schools and needy families at a cost of $273 million. Frozen French fried potatoes, bought for use in schools for the first time, were popular with both the children and school management. Fruit and vegetable juices, as well as canned meats, dry beans, instant mashed potatoes, and other vegetables and fruits, were distributed to needy families.

An innovative service launched in August now allows schools to receive whole frozen turkey or elect to take further processed rolls or parts of whole carcass turkey bought by USDA for school lunches. Formerly schools did not have this option and frequently ended up contracting locally for the additional processing. By having USDA include the work in the original purchase contract, uniform costs have been established, resulting in savings from 9 to 10 cents per pound. Cost of the additional processing is borne by the State or local school system.

Section 32 funds can be used to enable U.S. exporters to compete in foreign markets when other countries are underselling U.S. commodities through subsidy programs. In 1972, USDA helped chicken exporters sell nearly 11 million pounds of broilers in Switzerland and Greece, with subsidy payments of $1.4 million. Subsidy payments of $1.2 million were made to processors who exported 123 million pounds of lard to England.

PROTECTING BUYER AND SELLER

Regulatory programs of the Department of Agriculture protect the interests of farmers, marketers, and consumers, and help assure fair competition for sellers, orderly marketing, dependable food supplies. They also protect consumers against product misrepresentation.

Commodity Exchange Authority

Producers and consumers look to the Commodity Exchange Authority to safeguard competitive pricing of wheat, corn, soybeans, cotton, potatoes, and 15 other agricultural commodities on futures markets in New York, Chicago, Minneapolis, and Kansas City.

The hedging and price-basing services of the commodity futures markets are widely used by farmers, merchandisers, and processors. They also affect retail prices paid by consumers. The aim of the Commodity Exchange Authority is to assure open, fair, and competitive trading in futures contracts; to prevent price manipulation; and to protect persons trading in futures markets from cheating, fraud, and other abusive acts and practices.

Futures trading in the 20 agricultural commodities regulated under the Commodity Exchange Act continued its upward trend in fiscal year 1972. Volume of contracts traded reached a new record of 12.6 million, up 7 percent from the previous record of 11.8 million in fiscal year 1971. Value of futures trading, estimated at $148 billion, was 30 percent greater than the $114 billion a year earlier. Soybeans, the most active commodity in 1972 trading, reached an alltime record in trading volume. The 3,961 million contracts traded covered 19.8 billion bushels of soybeans, up 48 percent from 13.4 billion bushels in the previous year.

Frozen pork bellies, one of the consistently high-volume commodities in recent years, ranked second in market activity. Trading of 2,043,384 contracts represented a 34-percent increase over the number traded in fiscal year 1971.

Trading in live hogs, following the trading pattern for pork bellies, rose substantially and reached a new record of 366,450 contracts. Activity in the live cattle markets also reached a record level, and the cotton futures market was the largest in 17 years. Fiscal year 1972 was a record year both in volume and value of

commodity futures trading. It is expected that the upward trend in futures trading will continue in the years ahead.

Maintaining Competition in Livestock, Poultry, and Meat

The Packers and Stockyards Administration (P&SA) was highly successful during fiscal year 1972 in its efforts to maintain fair and open competition in the marketing of livestock, poultry, and meat.

Key changes adopted in posting and registration regulations require new registrants to prove solvency before being allowed to register to purchase livestock under the Packers and Stockyards Act. Another new policy requires bonds posted with P&SA on a voluntary basis to meet the same standards as bonds required under the regulations. These provisions provide better financial protection for livestock sellers, and protect the integrity of all bonds required under P&S regulations.

More than $728,500 was paid to 678 persons registering claims against the bonds of registrants. Another $519,525 was paid in claims against the bond of a meat packer. More than $200,000 was also awarded in reparation cases. Close attention to the financial stability of marketing agencies and dealers in the industry continued, with more than $4.5 million in capital added after 277 firms were notified that they were operating with insufficient capital. Another 315 firms made up 4.8 million dollars' worth of shortages in trust accounts after being placed on notice. These actions assure livestock producers that they will be paid the price agreed to for animals and poultry sold.

Emphasis continued on cooperation with State officials and education in the program to obtain accurate scales and reliable weighing. P&SA conducted scale-testing workshops with officials in six States. The weighmaster school program was extended into four more States, making a total of 38 States and more than 3,800 scale owners and livestock weighmasters who have received the benefit of such training.

When P&SA published official instructions for testing vehicle scales and weighing live poultry, producers gained the benefit from the same standards of weighing accuracy that had long been enjoyed by livestock producers.

Considerable emphasis was given to gaining voluntary compliance with the new poultry regulation pertaining to business dealings of packers, live poultry dealers, and live poultry handlers with poultry growers and sellers.

Many changes in contract contents, accounting, and weighing have been implemented by firms to bring their operations into compliance with these regulations. These changes have resulted in the transmission of more complete and accurate information to the poultry grower or seller.

The complete disclosure and writing of all terms and conditions affecting payment due the grower or seller of poultry have

benefited the entire industry by eliminating misunderstanding and misinformation concerning growers' business dealings with packers, live poultry dealers, and live poultry handlers.

The structure and operation of the livestock and meat industry dictate that marketing channels operate in an open and competitive manner, unburdened by costs of deceptive, discriminatory, or unfair practices, and controlled by neither buyers nor sellers. Close attention continued to be given to restriction of competition and unfair competition.

The Office of Hearing Examiners issued favorable findings of fact and a proposed cease and desist order against eight New York meatpackers. The firms were charged with restricting competition in the purchase of veal calves and the sale of carcasses.

Cooperative advertising and promotion guidelines, designed to correct unfair practices in the sale of meat, are being prepared in cooperation with industry leaders and other government agencies, and are now under review.

The program to combat unfair and deceptive advertising in the sale of meat was extended by providing counseling and technical assistance to State, local, and private groups. Officials of these groups can often move quickly under existing laws to stop such schemes as bait-and-switch advertising when they have the benefit of agency expertise and experience. Counseling and technical assistance has been provided to several States, including Maryland, where State officials recently arrested five persons on criminal charges of conspiracy to defraud purchasers of meat for home freezers.

P&SA officials also managed a breakthrough in assistance to public livestock markets in controlling pollution within modern tolerance ranges and at the same time keeping the costs of change within reasonable limits. Several markets are following major recommendations from agency personnel designed to control the pollution problem by prevention rather than treatment.

Water consumption at major markets following these recommendations is expected to be reduced by as much as 2 million gallons per day. This not only conserves water but also eliminates the necessity for treatment of the water as a waste product. The market at Webster City, Iowa, expects to achieve a zero pollution standard. Management at the Sioux City stockyard initially estimated an investment of $7 million to meet new water quality standards for 3 years before requiring additional modification. The final plan, adopted in cooperation with P&SA, will cost $3 million without modification for several years, and is expected to result in better services and facilities to market customers.

COOPERATION ADDS PROFITS

As a result of a volume of business exceeding $19 billion, purchasing and marketing cooperatives will enable farmers this year to add an estimated $600 million to their income. The 1972 volume

of business represents an increase of $2 billion over that of 1971, and was the largest single-year jump in history. All this business was conducted by some 7,800 individual cooperatives, owned and operated by the people they serve.

The Farmer Cooperative Service (FCS) continues to focus on increasing income benefits and on strengthening the farmer's ability to influence how his product will be processed and merchandised. Research and technical assistance to support these twin goals are directed toward specific problems in these areas: (1) extending the marketing and operational coordination of farmer cooperatives; (2) improving financial structure; (3) improving farmer bargaining effectiveness; (4) developing more effective member relations programs; and (5) improving the quality of living for rural people.

Though the total payoff of FCS work is difficult to measure, an indication comes from a recent feasibility study to determine the benefit of building a cooperative soybean processing plant to serve farmers in three Midwestern States. The $18,000 one-time cost to make the study has the potential of benefiting farmers 25 times that amount annually.

In carrying out its research and technical assistance, FCS works with other Federal agencies, State and local governments, members of the cooperative industry, and universities.

Harvard Business School is gathering data on structure and business strategy of selected cooperatives. Texas A&M University is analyzing the financial structure of grain marketing cooperatives in the Texas High Plains. Improving member relations is the objective of a project with the University of California. Possibilities for further economic integration are being explored by the University of Florida in the development of a vertical market structure for the Florida fresh grapefruit industry. North Carolina University is evaluating the investment opportunities for cooperatives in that State. Cooperative pricing and pooling is being studied at Purdue University.

Some technical assistance is oriented to the cooperative as a business organization, with advice aimed at bringing greater efficiency to present operations or setting forth the merits of new ventures. Other assistance focuses on commodities presently handled or new ones that could be undertaken.

FCS specialists are looking for improved operations in a variety of situations, ranging from least-cost milk hauling systems to the benefits of merging 14 dairy cooperatives; from determining the grain marketing system and facilities needed by one regional cooperative to the benefits of coordinating the transportation of 14 regional cooperatives.

The growth rate of leading cooperatives has been compared with other firms with similar functions. A strategy for future growth has been developed.

Other commodity-oriented assistance is being conducted to improve the processing and marketing of sugar beets, cotton, hogs,

rice, wool and mohair, veal, catfish, and nursery stock. FCS is now assessing the farmer's potential for growing and marketing through cooperatives a few new crops such as crambe, sunflowers, jojoba beans, geese, and cornish hens.

These steps forward are providing new hope for future progress in rural areas. They are very helpful in helping to convince younger rural residents that opportunity exists for them at home as well as in the big metropolitan areas.

This information clearly indicates that a tide is running for agriculture, a tide that has not only turned in favor of farmers during the recent past but has also contributed substantially to national interests. Consumers, eating better than ever before, continue to spend less than 16 percent of their disposable income for food. And with a 1972 gross income expected to exceed $65.5 billion, up from $60.1 billion in 1971, farmers continue to consume huge percentages of the output of industry and labor. But the struggle for improved farm income is not over. Per capita income of farm people is still only 83 percent of that enjoyed by nonfarm people. This cannot be tolerated. The average age of today's farmer is over 51 years. That average is too high. To attract and hold more young farmers, Americans must work to achieve an average income in agriculture that is fully commensurate with nonfarm income.

There is still the risk of excessive production, surpluses, and depressed prices. American agriculture has the capacity to produce far more than current markets will absorb at satisfactory prices. A soundly structured farm program is necessary to deal with the problem of excess production.

Such a program must continue to provide for an expanding agriculture based on expanding markets, with the role of Government directed increasingly toward *serving* farmers rather than *dominating* farmers.

NEW VISTAS IN FOREIGN TRADE

Breakthroughs in U.S. sales of farm products abroad during 1972 dramatically proved that this is truly the international age of agriculture.

Total U.S. sales of farm products to other nations exceeded $8 billion and broke all records in 1972. The President's goal of $10 billion in annual farm exports by 1976, America's Bicentennial Year, was achieved this fiscal year—3 years early.

The grain sale agreement, signed by the United States and the Soviet Union on July 8, 1972, paved the way for sales of U.S. farm goods abroad at an unprecedented level. Perhaps more important, the new agricultural trading climate with Russia and with the People's Republic of China has moved us much closer to a lasting peace—a peace that could be founded on grain from the farms of America.

With the record sales to other nations during 1972, and expected further growth during fiscal year 1973, the United States has entered a new era as a world food supplier. The $10 billion of farm goods expected to be sold during the current fiscal year represents an increase of almost 25 percent in farm exports in just 1 year.

The grain purchases by Russia, in addition to increasing farm income more than $1 billion, will cut farm program costs to taxpayers by a net of $200 million. Purchases by Russia of about $1.2 billion worth of U.S. wheat, corn, and soybeans will account for nearly half the total increase over fiscal 1972 exports, which reached $8.1 billion—also a record.

Russia, which bought only $158 million worth of American farm products in fiscal 1972, has vaulted to the number two position as a customer of U.S. agriculture with its purchase this year. The Soviet Union is second to Japan, the long time one-country leader, which has projected farm purchases from the United States of $1.5 billion by the end of fiscal 1973.

In addition to helping to boost the income of American farmers and enhancing the opportunities for a lasting world peace, the exports projected for the current fiscal year will give the United States a $3.5 billion balance of trade surplus in agricultural products.

This dramatic recovery in farm exports is the result of determined effort and positive action:

- In 1969, a market-depressing soybean support price of $2.50 was cut back to the market-stimulating level of $2.25, thereby removing the umbrella of price protection from the

competitors of American soybean farmers. The Export Marketing Service was established to give a new thrust to overseas sales. Now soybean demand is up. We had just 60 million bushels on hand in September, compared with 324 million bushels in 1969. Soybean prices are up. Soybean production is up. Income for soybean farmers is up. Soybean exports are up. In the process, Japan became America's first $1 billion farm-export customer—with soybeans representing a sizable portion of that trade.

- The Agricultural Act of 1970 was intended to lay the groundwork for an expanding agriculture and for farm export growth. It aimed at freeing farmers from some restrictions and controls. It sought to enable farmers to earn more income from the marketplace.

  Since passage of the Act, more farmers are voluntarily participating in the farm program than before. Prices have improved. Farm income is at a record level—though still not high enough. And this progress has been achieved with an expanding, market-oriented agriculture which is making possible 3 consecutive years of record farm exports.
- In June of 1971, the President removed the requirement that 50 percent of all U.S. wheat and feed grain exports to the Soviet Union and certain other Communist destinations had to be carried in U.S. ships. This action paved the way for the November 1971 sale of $150 million worth of feed grains to the Soviet Union, and the subsequent grain sale agreement.

On July 8, 1972, Russia agreed to purchase from the United States over a 3-year period at least $750 million worth of U.S.-grown grains. Russia has since purchased more than $1 billion of wheat, soybeans, and feed grains from the United States.

This sale is important to the Nation as well as to American agriculture.

- It increased the value of U.S. farmers' 1972 grain and soybean crops by an estimated $1 billion.
- It reduced U.S. stocks of grain that were in danger of pushing to burdensome levels.
- It cut costs of farm programs to taxpayers by increasing the value of Government-owned grain, reducing storage costs, and reducing payments under the set-aside program.
- It pushed agricultural exports toward new records expected for calendar year 1972 and fiscal year 1973, with the prospect of even larger agricultural contributions to balances of trade and payments than those in fiscal 1972.

RECORD COMMODITY SALES

The farm sales breakthrough beyond the $8 billion mark in fiscal 1972 represented a gain of 4 percent over the record of $7.8 billion set in fiscal 1971.

The 1972 total included shipments of animals and animal products that exceeded $1 billion for the first time and shipments of soybeans and products of more than $2 billion, the first time any export commodity has reached $2 billion.

It was the third straight year of agricultural export increase after a decade in which shipments hovered between $5 billion and $7 billion.

An examination of the Nation's agricultural export sales since 1965 shows:

Agricultural Exports by Fiscal Year

1965	$ 6.1 billion
1966	6.7 billion
1967	6.8 billion
1968	6.3 billion
1969	5.7 billion
1970	6.7 billion
1971	7.8 billion
1972	8.1 billion
1973 ....(estimated)....	10.0 billion

Commercial sales for dollars have accounted for all of the $2.4 billion increase in farm exports since 1969. Sales of U.S. farm goods for dollars reached a record $7 billion in fiscal 1972. The remaining $1.1 billion worth of farm goods moved under various Government-financed programs.

Agricultural exports for 1972 represented an agricultural contribution to the Nation's balance of trade of $2 billion and to the balance of payments of about $1 billion.

On the farm, exports of $8 billion required the output of 1 cropland acre in 5, or 65 million acres nationwide. Exports took more than half the rice and soybeans produced on U.S. farms, two-fifths of the wheat, cattle hides, and tallow, and about one-third of the tobacco and cotton products.

Higher Unit Prices

Higher prices were responsible for nearly all the value increases in exports in fiscal 1972. Total volume was about the same in 1971, but the aggregate price index was about 3 percent higher.

Export value gains were shown in soybeans, feed grains, cotton, dairy products, cattle hides, beef, pork, fruits, nuts, and vegetables. These more than offset reduced shipments of wheat, flaxseed, alfalfa meal, and lard in fiscal 1972.

U.S. agricultural exports: Value by commodity, fiscal years 1970–71 and 1971–72

Commodity	1970–71	1971–72	Change
	Million dollars		*Percent*
Animals and animal products:			
Dairy products	131	195	+49
Fats, oils, and greases	273	229	–16
Hides and skins, including fur skins	186	237	+27
Meats and meat products	143	178	+24
Poultry products	55	57	+4
Other	115	115	0
Total animals and products	903	1,011	+12
Cotton, excluding linters	492	529	+8
Feeds and fodders, excluding protein meal:			
Corn byproducts	35	45	+29
Alfalfa meal	30	18	–40
Other	77	75	–3
Total feeds and fodders, except oil cake and meal	142	138	–3
Fruits and preparations	341	381	+12
Grains and preparations:			
Feed grains, excluding products	1,096	1,118	+2
Rice	289	307	+6
Wheat and products	1,225	1,071	–13
Other	95	109	+15
Total grains and preparations	2,705	2,605	–4
Nuts and preparations	66	83	+26
Oilseeds and products:			
Cottonseed and soybean oils	290	293	+1
Soybeans	1,274	1,391	+9
Protein meal	398	398	0
Other	111	140	+26
Total oilseeds and products	2,073	2,222	+7
Tobacco, unmanufactured	570	570	0
Vegetables and preparations	208	230	+11
Other	258	282	+9
Total exports	7,758	8,051	+4

GOVERNMENT AND INDUSTRY COMBINE FORCES

The key to successful export expansion in agriculture has been the recognition that Government, private companies, and private commodity and trade organizations must work together to achieve significant growth in overseas sales.

The way was cleared for the November 1971 sale of about $150 million in feed grains to Russia by two private American firms. And the sale was completed only after the Department of Agriculture used resources of the Commodity Credit Corporation to enable the two companies to meet the Soviet needs for barley and oats from U.S. grains rather than from grains of other countries.

The Russians wanted corn, which was on the U.S. market in plentiful supply at competitive prices, but they also wanted some barley and oats, which were not available on the market at world prices.

Stocks of CCC grain, which had been delivered by farmers to CCC in payment of price support loans, were offered to the grain exporters at world prices for sale to Russia in return for assurances that the Russians would buy substantial amounts of U.S. corn.

The companies agreed to export at least one bushel of U.S. corn from private stocks for every bushel of barley or oats purchased from CCC. The resulting sale totaled in the neighborhood of 75 million bushels of corn and more than 55 million bushels of barley and oats.

The November sale was followed by a visit to the United States by Soviet Minister of Agriculture Matskevich, during which he toured farming areas and met twice with the Secretary of Agriculture. Matskevich was assured of the ability of U.S. agriculture to produce an abundance of the grains and other feedstuffs the Soviets would need to expand their livestock production.

Journey to Moscow

Four months later, the Secretary led a team of USDA officials to Moscow to open trade talks. They were followed by the President's mission to Moscow in May and a Soviet mission to Washington late in June. This was climaxed by the President's announcement July 8 of the signing of the 3-year grain purchase agreement between the United States and the Soviet Union and the subsequent sales to the Soviets by private U.S. firms.

Department of Agriculture analysts foresee continued Soviet imports of grains and soybeans over at least the short term so long as the Soviets continue to seek expanded production of livestock and livestock products. As a result of the breakthroughs in 1971 and 1972, U.S. agriculture is in a good position to hold a substantial share of this market.

Mainland China also turned to the U.S. market for about 21 million bushels of wheat and 17 million bushels of corn, the first shipments of U.S. grain to the People's Republic of China since 1948.

The drama of the sales to Russia and China overshadowed progress on other export fronts—progress basic to the continued increase in U.S. farm exports.

Continuing Negotiations with Regular Customers

The Foreign Agricultural Service was intimately involved in U.S. negotiations with Japan and the European Community (EC) surrounding the monetary talks leading to the Smithsonian Agreement.

These negotiations brought trade concessions on several items important to U.S. agriculture. But important far beyond the concessions was the U.S. success in getting Japan and the European Community to agree to join with the United States in calling for and supporting general negotiations among all the members of the General Agreement on Tariffs and Trade (GATT) to seek a more liberal world movement of goods, including those of agriculture. Talks are scheduled to begin sometime in 1973.

In addition, Japan agreed to eliminate its duties on soybeans and inedible tallow, reduce duties on a dozen other commodities, and raise import quota levels on oranges, citrus juices, and quality beef.

The European Community committed itself to having discussions with the United States on the fiscal harmonization of the Community's tobacco tax, although no commitment was made to a date for these discussions.

The Community agreed to store an additional 1.5 million metric tons of grain in the 1971-72 crop year to ease world market pressures, pledged a similar effort for 1972-73, and agreed until the end of 1971-72 crop year not to subsidize exports on the market or to divert trade in its favor.

The European Community agreed to reduce tariffs on citrus, an important U.S. export, for 1972 and 1973 only. Tariffs are to be reduced on oranges during the U.S. export season and on grapefruit the year around.

FAS trade specialists are working with other agencies in the Executive Branch and with agricultural working parties of the GATT to prepare for the general GATT negotiations and for negotiations to protect U.S. trading rights involved in the EC enlargement.

Meanwhile, efforts continue to win removal of specific barriers to trade maintained by other nations. and some successes have been achieved. Norway, for example, removed quantitative restrictions on rice. The United Kingdom removed or increased certain citrus quotas. Spain provided duty-free entry for soybeans most of the year. Greece extended duty-free status for feed concentrates through the end of 1972. Taiwan and Yugoslavia reduced import duties on a wide range of farm products, and Sweden ended a number of licensing requirements.

Significant advances were made in improving and expanding Federal-State cooperation in overseas market development.

FAS helped form the Pacific Northwest International Trade Council, comprising Idaho, Montana, Oregon, and Washington, to help promote exports from those States. This is the third such group to be formed with FAS assistance, and efforts are underway

to organize a fourth among several Southern States. The Northwest group has taken the leadership in organizing trade relations for an FAS-sponsored Food Exhibit scheduled for the U.S. Trade Center in Tokyo, April 16-20, 1973.

A second regional organization, the Atlantic International Marketing Association, worked with FAS during 1972 in evaluating three FAS-sponsored food trade shows in the Caribbean.

FAS and representatives of Florida, Louisiana, Maryland, North Carolina, and Texas have begun a long-range study to identify and solve shipping problems in the Caribbean market.

The Mid-America International Agri-Trade Council, the first State group formed with FAS help, joined with FAS in staging a successful American Food Festival in Tokyo, Japan in April.

With the cooperation of the States, listings in the Trade Opportunity Referral System, begun in 1971, were increased by 50 percent in 1972. This is a computerized information bank now listing 1,900 U.S. agricultural suppliers in 44 States and 6,500 buyers in 50 countries. Buyer inquiries are routed to appropriate suppliers through the system, which also is used to select international trade contacts and for direct market development mailings. The U.S. trade reported sales approaching $5 million the past year as a result of contracts through the trade referral service.

A prime example of USDA-private enterprise cooperation in market development has been operating for more than 15 years. It is the cooperator program in which USDA's Foreign Agricultural Service and private commodity and trade groups join together in specific overseas sales expansion projects of up to 3 years' duration. Under this program, breakthroughs were achieved in 1972 that could be significant for the export future. Among the commodities affected were dairy cattle, poultry, citrus, feed grains, and cotton.

Joint efforts by the Poultry and Egg Institute of America, U.S. agricultural attachés, and FAS poultry specialists in Washington opened new markets for poultry products in Denmark, New Zealand, and Malaysia.

Denmark, which had traditionally kept out U.S. cooked poultry products, was persuaded to grant import licenses for cooked turkey thighs; New Zealand, which had prohibited all U.S. poultry, agreed to let cooked products enter; and Malaysia removed its ban on uncooked whole turkeys and turkey products.

The PEIA followed the Danish action with a promotion in which a trial shipment was quickly sold out, indicating a good potential in both consumer and institutional markets.

Educational work by U.S. cattle breed associations and participation in FAS-sponsored exhibits at livestock shows during the year helped to sell about $1 million worth of U.S. dairy breeding cattle in Spain and more than $1 million worth in Italy. The enthusiastic response to the quality cattle shown by the United States indicates that prospects are bright for continuing exports.

U.S. Cooperatives in Foreign Trade

About 100 U.S. cooperatives are conducting foreign trade business in excess of $1.2 billion annually, according to the first such statistics compiled by Farmer Cooperative Service.

These cooperatives account for about 14 percent of U.S. direct exports. Indirect sales (products sold by cooperatives to other U.S. firms for export) would add another 7 percent. However, cooperatives account for a much higher percentage of certain commodities—43 percent of fruits and preparations, 31 percent of grains and preparations, and 23 percent of cotton and cotton linters.

Cooperatives' biggest customers are Japan, India, and the Republic of Korea (in that order).

FCS is encouraging stepped-up cooperative activity in foreign trade because (1) new markets are opening in Russia, China, and other Communist nations; (2) major export volume is in raw commodities that U.S. farmers are producing in excess of U.S. demand; and (3) export market expansion can have an immediate effect on farm income.

Discussions with cooperative leaders have led to trade missions to Eastern and Western Europe and to Japan. The feasibility of a national cooperative organization to pursue foreign trade is being considered.

Discussions have been held with representatives of Zen-Noh, the Japanese national agricultural cooperative organization. FCS is searching for cooperatives in this country that could supply Zen-Noh with food and fiber products.

Researching New Sales Possibilities

FAS and the U.S. Feed Grains Council joined with a South Korean company in a pilot beef cattle feeding trial to demonstrate the economic value of finishing cattle on high grain rations. The project, involving 264 U.S. calves airshipped to Korea, proved the profitability of such feeding enterprises and drew wide attention from both government and commercial agricultural interests in the Far East. It is expected to be an important milestone in the effort to expand exports of U.S. feed grains in the East Asian area.

Pilot projects to expand sales of U.S. cotton were launched in Japan and France by the Cotton Council International (CCI), using two avenues of approach: (1) Supporting joint advertising with local firms of 100 percent cotton goods containing more than 50 percent U.S. cotton; (2) providing local spinning mills with the services of a U.S. cotton spinning technologist to help solve problems encountered with U.S. cotton.

While the projects are not completed, reports from Japan, where the project is furthest advanced, are that it has been well received by the industry.

The liberalization of grapefruit imports by Japan triggered intensive promotional activities by U.S. citrus organizations cooperating with FAS. Five brand-oriented export incentive agreements, where the extent of FAS cost sharing is keyed to sales gains, and one promotion program helped push U.S. grapefruit exports to Japan to more than $18 million from about $800,000 the previous year. Prospects are for sales as high as $30 million in the current fiscal year.

World Responsibilities

USDA's responsibilities extend beyond U.S. borders to encompass the low-income nations of Africa, Latin America, and Asia. The Economic Research Service now coordinates international development programs, working closely with all USDA agencies to provide the help needed to aid other nations in improving their agriculture and rural living conditions. Last year, more than 400 USDA specialists worked in developing nations. Some 1,200 foreign agriculturists also received training in the United States.

Special cooperation with the Turkish Government to plan agricultural development in a former opium poppy growing area highlighted USDA's foreign program this year. Turkey's ban of poppy cultivation was part of a U.S. Government program to fight habitual drug use in America.

A special economic study of South Vietnam's agricultural industry was also conducted. The study will help the Vietnamese plan agricultural progress. Department scientists continue their research in Africa for higher yielding strains on millet and sorghum, while USDA economic advisors help the Ministries of Agriculture in Kenya and Liberia improve their agricultural development planning, analysis, and action programs.

USDA specialists in El Salvador are helping improve marketing, extension, and research programs. A nutrition advisor in India is concerned with developing foods which will improve nutrition levels there. Soil and water management teams are located in India, Thailand, and Tunisia. An advisor in Colombia worked on agrarian reform activities, including supervised credit for small farmers, while another assisted with transportation and marketing problems.

USDA foreign training efforts reflect a growing sophistication of agricultural leaders in the developing nations. They are requesting more training in administration and management, agricultural policy and planning, and cooperatives and marketing; these are complementary to the more technical agricultural skills which still receive appropriate emphasis in USDA training.

- For the Turkish Government, USDA arranged and conducted two Executive Management Seminars in 1972, making a total of four such seminars conducted for 62 Turkish agriculturists since 1970. Now, those Turks, already trained, are helping improve management skills of their coworkers in special in-country training sessions.

- Most aid agencies, such as the World Bank and the U.S. foreign assistance program, require special studies and development plans from developing nations when financial aid is requested. USDA conducted a course for agricultural planners from 12 nations to help them learn the techniques for preparing project proposals.

The USDA worked closely with the Agency for International Development on programs to improve the quality of diets in the developing nations.

- An evaluation focused on the consumer acceptability of U.S.-donated blended foods, such as CSM (corn-soy-milk) and WSB (wheat-soy blend), is now being carried out by specialists in Brazil, India, and the Philippines.
- A survey is also underway to find ways to improve the diets of preschool children; special attention is being given to health benefits and distribution costs.
- A project has been started in Brazil to fortify mandioca flour with soy grits to improve its protein level. Mandioca is a staple starchy food in many low-income nations.

THE WORLD GRAIN SITUATION

The world grain situation for 1972-73 was influenced strongly by the Soviet Union's short wheat crop and its massive grain purchases. A sharp decline in world wheat stocks by July 1, 1973, is in prospect. Other outstanding factors in the world grain situation were an unusual concentration of wheat stocks in North America, unusually low rice supplies in Asia, and uncertainty about the adequacy of grain crops in India and the People's Republic of China. These developments significantly increased grain prices during 1972.

World grain production declined in 1972 but was still the second largest on record and coincided with relatively large stocks as of mid-1972. Unfavorable weather was primarily responsible for an estimated 25-percent drop (about 20 million tons) in the Soviet wheat crop and resulted in reduced quality of grain. Estimated Soviet purchases of some 27 million tons consisted of roughly 19 million tons of wheat and 8 million tons of feed grain—with part of these amounts going to meet commitments to other countries. About two-thirds of the Soviet grain purchases came from the United States.

THE U.S. IMPORT SITUATION

Our agricultural imports totaled $6 billion in 1971-72, exceeding those of all other countries except West Germany. A large proportion of the developing countries' agricultural exports enter the United States duty free or, under a quota system, at higher than world market prices. Most noncompetitive commodities—coffee,

cocoa, tea, rubber, bananas, and most spices—enter without import duties. Sugar exporters, who are under quotas, are paid substantially higher prices in the United States than in other markets.

Lain American countries exported $2.4 billion worth of agricultural products to the United States in fiscal year 1972, as well as $3.0 billion in other items. This helped finance the $5.9 billion in nonagricultural imports from the United States. Among the Latin American Free Trade Area countries, only Peru and Venezuela have favorable trade balances with the United States.

The Central American Common Market members depend even more on agricultural exports to the United States. Shipments of $385 million in agricultural goods, such as coffee, bananas, sugar and meat, allowed those countries to purchase U.S. manufactures without a substantial trade deficit.

In fiscal 1972, African countries shipped $576 million in agricultural products to the United States, compared with $794 million in nonagricultural items. At the same time, U.S. nonagricultural exports to Africa totaled $1,277 million and agricultural shipments amounted to $322 million.

Voluntary restraint levels on meat imports were eased in March 1972 and removed for the remainder of the calendar year June 26. Chilled or frozen beef accounts for the bulk of meat under import quotas.

The "price break" on cheese imports was raised from 47 to 62 cents in June 1972, aligning it at a flexible level based on dairy price supports. Imports of cheese priced at less than the price break level are subject to quotas, which were adjusted to fit the new situation.

THE ROAD AHEAD

The world market for agricultural products is growing. Incomes are rising in most countries as economies expand, and when incomes rise, people want more food and better food.

U.S. farmers, thanks to geography, climate, and technology, can supply a wide range of products to fill these needs, including the grains and protein meals basic to modern livestock industries, and they can do so more efficiently and more abundantly than farmers in any other country.

The objective of the Department in the years ahead is to help U.S. agriculture to capitalize on the opportunities for growth offered by the expanding overseas market—to maintain the export momentum that has been building over the past 3 years.

To maintain the momentum means domestic farm policies that are oriented toward the market, that permit U.S. producers to remain competitive in price as well as quality. It means continued emphasis on developing and expanding overseas markets in the face of increasing competition from other suppliers. And it means trade policies oriented toward a freer international movement of agricultural goods, based on the principle of comparative advantage.

THE CONTINUING WAR AGAINST HUNGER

Great strides have been made in recent years in the continuing war against hunger, but the struggle must be waged with continued vigor.

In 1967 and 1968, citizens of the United States began to recognize the severe and growing problem of widespread poverty-related hunger, as well as the massive amounts of nutritional deficiency in many citizens—both affluent and poor.

President Nixon's Hunger Message to the Congress on May 6, 1969, inaugurated a full-scale, continuing attack on the double problem of hunger and malnutrition. For many the war is over. They are the multitudes of people who are eating better, more balanced meals and as a result are feeling, thinking, and living better than ever.

To continue working toward the goal of putting an end to hunger throughout the land requires the production of healthful food in sufficient quantities. America's farmers have never failed in that challenge. Feeding the poor and undernourished requires income supplements and educational programs that reach all strata of society. The poor need more food, and many of the Nation's rich need a better understanding of how a balanced diet will help them to be healthy, happy, and productive citizens.

In early 1969, nearly 500 counties and independent cities had no food programs available for those in need. At the end of 1972 only six counties in the Nation were without a food assistance program, and these are small counties with a total population of 17,000 persons. Food assistance, therefore—either food stamps or direct food distribution—is available to virtually all who need such assistance.

FOOD ASSISTANCE PROGRAMS

In 1972 the cooperative Federal-State programs of food assistance reached more low-income families and helped feed more needy children at school than ever before. Help to individual families and households, in either food stamps or donated foods, has increased from a level of reaching 6.5 million people in 1968 to 14.8 million people in 1972.

Five out of six schools now have school lunch programs, providing meals at modest cost to all students and at little or no cost to the needy. In 1972 the Department intensified its efforts to

close the remaining gaps in nationwide coverage of food assistance activities.

Food Stamp Program

The largest growth in family food help has been in the Food Stamp Program, which, by November 1972, was adding $175.7 million a month to the food-buying power of over 12 million low-income people, compared with about $148 million a month for 11.1 million people a year earlier. Three years ago food stamps were aiding 3.6 million of the Nation's poor, adding $24.5 million monthly to their food-buying ability.

The gains since 1970 are the result of increases in food stamp benefits, major food stamp reform legislation in 1971, and counties changing from the direct Food Distribution Program to food stamps. Of a total 3,129 U.S. counties and cities, 2,213 were in the Food Stamp Program at the end of 1972. During the year:

- State governments undertook broadened "Outreach" campaigns to inform low-income families of food stamp benefits and how to get them. Public agencies, civic organizations, and business groups joined cooperative efforts to reach the poor through personal contact, mass media, and specialized leaflets tailored to specific audiences. Hawaii, as one example, issued a trilingual food stamp pamphlet in English, Japanese, and Illocano (a Filipino dialect).
- Efforts to reach specialized audiences were intensified, with 10 new Spanish translations of food stamp publications issued during 1972. An official food stamp poster for display in participating stores is available in five languages.
- The first "cost-of-food" increase in benefits, mandated by the 1971 legislation, took effect in July 1972, increasing the monthly food stamp allotment for a family of four from $108 to $112.
- In October 1972, some 365 nonprofit meal delivery services were authorized to accept food stamps for meals provided to disabled elderly poor.
- Recipients of public welfare in parts or all of 24 States can elect to have the purchase price of their food stamps automatically deducted from their welfare checks, so that they receive their food stamps in the mail along with their checks.

The U.S. Postal Service expanded its role in the Food Stamp Program during 1972. In 770 food stamp counties in 26 States (representing 35 percent of all food stamp areas) users now have the option of buying their food stamps by mail. Additionally, 12 States have contracted with the Postal Service to issue food stamps to participating families in certain local post offices.

Although the program of direct distribution of food to families narrowed its geographical scope it improved its services to the poor in areas served by the program.

Nationally, total participation in the family Food Distribution Program declined from a peak of 3.6 million people helped in February 1972 to about 2.7 million people during November as many areas changed over to the Food Stamp Program. Over 1.2 billion pounds of food worth over $312 million were distributed to needy persons in 1972.

Additionally, some 8,600 public and nonprofit private institutions used donated foods to add substance and variety to the diets of 1.3 million needy patients and residents. These foods were also used in 7,200 nonprofit summer camps to help provide food service for 1.4 million children. Food distributed to both institutions and summer camps during 1972 totaled 125 million pounds, at a value of $26 million.

School feeding programs, among the biggest users of donated foods, received nearly 1.2 billion pounds of food worth over $300 million.

In the past year, 65 counties converted to the store-like, self-service method of distributing food to recipients, bringing to 156 the number of such counties in 19 States.

Labels on the more than 20 foods offered for distribution have been redesigned and updated to better inform recipients of the package contents and how to use them. Color illustrations, corresponding to the actual food color, assist homemakers with limited reading skills, and the name of every product is given in Spanish as well as English. Many of the recipes and instructions are also given in Spanish.

Young volunteers made impressive strides in enlarging USDA's Drive to Serve Program through which youthful drivers deliver donated food packages to home-bound elderly. U.S. Jaycees adopted Drive to Serve as one of its five national priority projects for 1972-73. Other national organizations were encouraged to follow their lead.

Progress was made in assisting schools and institutions to fully use their donated foods. Plans were developed to encourage schools and institutions to contract with commercial food processors to help this maximum utilization. These "food processing contracts" enable schools to better use donated foods and to cut operating costs. Among the donated foods under such contracts are bulk butter being processed into butter pats, ground pork into frankfurters, flour and shortening into pizza shells and other pasta products.

In additon, increased effort is being made to draw more ethnic firms into purchase programs. Negotiations were continued with Puerto Rican vendors to process USDA foods into a more acceptable form for use by needy families in Puerto Rico. This year,

all-purpose flour and cornmeal were purchased in the United States and processed on the island for use in food programs.

Emergency Food Help

In the wake of at least 18 separate disasters—such as floods or hurricanes—USDA food assistance, including 3 million pounds of donated foods and over $11.8 million in food stamps, helped sustain over 600,000 victims following the tragedy.

Hurricane Agnes dealt the widest blow, affecting five Eastern States. Nearly 150,000 people in those States were aided by $980,000 worth of donated foods—largely used in shelter feeding for the homeless. Emergency issuance of free food stamps took over once stores reopened and people returned home to begin the massive cleanup job. Over 560,000 Agnes victims received close to $11 million in food stamp aid. Emergency food assistance also aided victims of the Rapid City, S. Dak., flood disaster, in which the victims required donated food relief for about 70 days—the longest period of continuous mass feeding since the 1964 Alaska earthquake.

Child Nutrition

In 1972, a concerted effort was made by Federal, State, and local governments and the private sector to offer nutritious meals at school to all children, especially those from low-income families. The number of needy children served free or at a reduced price by the School Lunch Program reached a peak of 8.4 million last year. This is almost a third of the 25 million children taking part in the program.

The number of children served breakfast at school continued climbing in 1972 to 1.2 million—compared to 362,000 in 1969. The summer feeding program reached 1.3 million youngsters last year. The year-round program for preschool children in nonprofit day care centers served nutritious meals to over 200,000 children from needy families in low-income neighborhoods.

New legislation (Public Law 92-433) amending the National School Lunch Act raised the Federal payments for all lunches from an average 6 to 8 cents a meal. On top of that, there's an additional payment of about 40 cents for every lunch served a needy child. The new law also extends the performance system of funding to the School Breakfast Program, beginning in the fall of 1973, and makes all schools eligible for the breakfast program, for which priority previously was given to schools serving poverty areas and whose students traveled a long distance to school.

A major drive was launched to get food service into the remaining American schools that do not have such programs for their students. Half of the funds which the Department of

Agriculture is authorized to spend for equipment to operate food service programs are reserved for schools without programs.

Until last fall, schools in Weslaco and Mission, Texas, attended by 12,000 youngsters, were in the "no-program" category. Eighty to 90 percent of the student body could not afford to pay for lunch, and their schools were too poor to start a food service on their own. Federal, State, and local leaders joined forces to make best use of every available resource, and in September of last year, the student bodies in both towns celebrated the opening of new school cafeterias.

The goal to reach all schools needing a school lunch or breakfast program was emphasized in the first report of the National Advisory Council on Child Nutrition, presented to President Nixon and the Congress in March 1972. The report also recommended more emphasis on nutrition education and training of school food service personnel.

A coordinated effort was continued to engage the cooperation of the food industry, America's food technologists, and nutrition scientists to seek new ideas to improve school feeding programs. New foods were tested for possible use in the School Lunch Program in a coordinated search for new ways to improve nutrition, lower costs, and improve convenience and acceptability of food served in school.

A demonstration summer project involving 10,000 children at 50 Cincinnati, Ohio, playground sites aimed toward a model summer food service system. Meals were prepared and delivered from central preparation facilities and included traditional hot lunches as well as innovative foods, such as fortified sandwiches and snacks.

A 10-part television course was developed on food and nutrition for school food service workers and parents.

Plentiful Foods Program

Foods in abundant supply can be a problem or a blessing. USDA attempts, through its Plentiful Foods Program, to turn supplies of foods that might become problems to producers into blessings for consumers.

Each month, USDA lists those foods that are in heavy supply and publicizes the list to consumers, food service establishments, wholesalers, and retailers. When a food is in heavy supply, its price should be relatively lower, and that's the blessing to the buyer.

In 1972, many retailers used the Plentiful Foods symbol in their food ads to make consumers more aware of each month's plentiful foods. In June 1971, the Secretary of Agriculture began to award Certificates of Appreciation to members of the food industry, news media, and others who cooperated in carrying out the program.

The Smart Shopper, a publication which promotes plentiful foods and other good shopping values in food, is provided monthly to educators for use in teaching persons with limited cooking skills.

The illustrated recipes in Smart Shopper found new uses in 1972: The Florida School for the Deaf reported that Smart Shopper was the first practical teaching tool they had found to use with the congenitally deaf, and the North Dakota Association for the Mentally Retarded used it in a newly developed educational program.

NUTRITION: GREATEST FOOD VALUE

More than 360,000 families were enrolled in the Extension Service Program of Expanded Food and Nutrition Education in 1972. Since it began 4 years ago, the program has contacted more than 3 million families.

EFNEP, as the program is called, was designed to provide educational assistance in meal planning, food shopping, better use of donated foods or food stamps, family nutritional needs, and other subjects that can influence a family's nutritional level. The target audience: hard-to-reach poor families. Paid aides do the teaching in the communities where they live. They are hired, trained, and supervised by the local Extension home economist. This job opportunity is the first permanent position for many aides.

In June 1972, about 9,000 aides were working part time or full time in about 1,500 independent cities, counties, and Indian reservations in the 50 States, District of Columbia, Puerto Rico, and the Virgin Islands.

Through this program Extension is making a breakthrough in helping poor families. Nearly 60 percent of the program families have incomes under $3,000, and almost 90 percent have incomes under $5,000. Urban families comprise 58.3 percent of the program participants. Minorities—blacks, Spanish-Americans, and Indians—total 64.7 percent of the families enrolled.

Nutrition practices of program families have noticeably improved. About 50 percent of the homemakers enrolled in the program had diets lacking in one or more of the four food groups when they entered the program. After 2½ years in the program, the number of homemakers with minimum adequate diets—two daily servings each of milk and meat and four each of bread or cereals and fruit or vegetables—increased from 7 percent to 27.9 percent. A positive effect on diet improvement, particularly in the consumption of milk products and fruits and vegetables, was directly related to the number of home visits by the aides.

Promising Progress

The following examples show the kind of help EFNEP offers and the progress that families make.

A Mexican family in California has adjusted to its new home with help from their EFNEP aide. The aide encouraged the family to

apply for food stamps and plan meals that would be nutritious and satisfying. Spanish-speaking herself, the aide was able to persuade the mother to attend English language classes at night. An Extension nutrition newsletter written in English and Spanish was helpful. The young father was encouraged to enroll in Manpower Training; now he has a steady job and a living wage.

When an EFNEP aide in Texas first visited one family with 14 children, she found a dilapidated three-room shack, a father who was unemployed, a mother who was ill, children who were sick with sores and infections, no refrigerator, no food storage space, and little food on hand. The twins in junior high school took turns going to school because the family couldn't afford to buy two lunches. After 2 years' work with this family, the EFNEP aide has seen much improvement. She has been able to help the homemaker acquire a knowledge of foods, and thus improve the family's diet, and also has taught her basic money management and food preparation skills. A priest helped the father get a job. The family has moved to a six-room house and bought a secondhand refrigerator. All 12 school-age children now eat lunches at school. The family is using donated foods, supplementing them by shopping once a month at a discount store. The mother and children are well now and life is looking much brighter for this family.

An EFNEP aide in Colorado found a family of 10 living in three small rooms with no bathroom facilities or running water. The father was disabled due to an accident. The aide helped the family apply for welfare assistance and disability aid, plus food stamps. The family has now built a three-room addition to their house and bought a used freezer to store the food they grow.

It took four visits before an EFNEP aide was admitted to a home in Nebraska because the homemaker was fearful of outsiders. Gradually, the aide won her confidence. She helped the homemaker learn basic food preparation skills so that she could stop buying so many expensive convenience foods. She taught the mother how to read labels, how to shop, and how to use leftovers. She also persuaded the mother to give her children milk instead of sweet, fruit-flavored drinks. Through the aide's help, the oldest child was accepted for Head Start.

A North Carolina family living in a public housing project became so interested in better nutrition, thanks to an EFNEP aide, that they planted a vegetable garden in the small yard at their apartment. To add a touch of beauty, the homemaker planted a row of flowers in front. She told the Extension agent, "The flowers are a cover-up for my garden. People passing by will see it as a flower garden, but my family will be eating fresh vegetables from this little spot all summer."

Reaching Low-Income Youth

Nutrition education is not limited to low-income adult homemakers. A specific and intensive EFNEP program is conducted for low-income youth.

During the past fiscal year almost 900,000 youth participated in this Extension nutrition program. Among some of the methods employed to reach these young people were meetings, where educational material was presented, individual projects, and day camps. Volunteers provided the adult leadership for the nutrition program. More than 50,000 adults from neighborhoods where the youth lived served as leaders in 1972.

Project Find

Project Find is an innovative effort to find older Americans in need of food assistance, inform them that they are eligible for food assistance programs, and—where possible—with the help of volunteer groups, assist them to enlist in those programs.

Volunteers trained by Extension home economists in Delaware contacted elderly persons at 10 food distribution centers. A mailing list was compiled with the names of the older citizens, and self-addressed cards were distributed asking whether they knew of other elderly people who needed the same type of program. The response was good, and many senior citizens who needed help with food were introduced to food assistance programs.

Wholesome Food Program

Food safety has been emphasized by: (1) an Extension Service-USDA work group developing pilot programs with food handlers to improve handling practices, with emphasis on reducing salmonella contamination of food; (2) State Extension consumer information programs; and (3) Extension home economists emphasizing food safety in several of their programs, and especially the Expanded Food and Nutrition Education Program.

Some highlights of food safety programs for consumers by the State Extension Services include:

Consumer information: The consumer marketing specialists in Michigan supply food information to 22 major dailies with a circulation of 3.2 million. Missouri specialists produce radio tapes on food buying, wholesomeness of foods, and consumer tips; the tapes are used on 82 radio stations. In California, specialists have prepared, in both English and Spanish, TV and radio spots on handling food and nutrition, these spots have had extensive use on commercial and Spanish stations. The Minnesota Extension Service has developed a publication on salmonellosis and a series of fact sheets on food microbiology. Massachusetts has a publication on bacterial food poisoning.

Information and programs for processors of food: In Georgia, specialists conducted sanitation workshops for 80 poultry and meat processing plants, with emphasis on training personnel. Educational assistance was given to 300 meat processing plants to enable them

to meet new Federal and State requirements, including providing blueprints for renovation and new plant structures.

In Florida, the Extension Service developed a program to aid in systematic shelf-life testing of dairy products, and a quality control seminar was conducted for 40 handlers of frozen foods to improve frozen food quality. The Ohio Extension Service has developed and sold to retail distributors over 150 slide sets which tell the basic principles of microbiology as applied in meat sanitation.

The Maryland Extension Service has been working with the Maryland Health Department, milk processors, producers and food retailers to establish a 7-day expiration date for milk after processing and to establish a standard of 40 degrees temperature for the holding and displaying of milk in food stores. In Delaware, the Extension Service has been working on the problem of waste water from poultry processing. Delaware Extension has also initiated a program for solid waste handling systems for small and independent retail stores, which includes the disposal of paper, glass, and byproducts from produce and meat operations.

Other Nutrition Work

Not only low-income families suffer from inadequate nutrition. Even among those who are relatively affluent, inadequate attention to proper nutrition is common.

Special programs are conducted by the Extension Service for young homemakers and mothers of small children who cannot attend meetings. Newsletters, correspondence courses, newspaper columns, and radio and TV programs are methods employed to reach this audience. Special programs also are conducted for senior citizens, and social and welfare workers and others who have contact with these people receive nutrition training.

In addition, nutrition information is carried to millions of homemakers through volunteer leaders trained by Extension home economists.

Food and Nutrition Information and Educational Materials Center

The National Agricultural Library and the Food and Nutrition Service are jointly participating in the operation of a center to provide informational materials to nutrition and school lunch personnel, to help improve the quality and acceptance of school food programs.

The center is charged with assembling and maintaining a repository of instructional materials relating to:

- Training and instruction of school food service personnel.
- Management of school feeding services, specifically as carried out under authority of the Child Nutrition Programs.

- Management and training research specifically pertinent to the Child Nutrition Programs.

Services provided by the center will include dissemination of center materials; loan and facsimile copying; referral service; lists of materials; annotated bibliographies, abstracts, extracts, synopses; and full access to the main National Agricultural Library collection and service.

The center is designed to be used primarily by Food and Nutrition Service personnel, State school lunch directors, school food service personnel, and local system school lunch supervisors.

RESEARCH FOR EVEN BETTER FOOD

Milk, meat, and eggs are major dietary sources of saturated fat, and some medical authorities have linked saturated fat to an increase in heart and blood vessel diseases. Milk higher in polyunsaturated fats—and lower in saturated fat—might help some people by reducing the amount of saturated fat in their diet. In recent experiments, Agricultural Research Service dairy scientists were able to increase milk's normal proportion of polyunsaturated fats to saturated fat by substituting encapsulated safflower oil for part of the feed of dairy cows. This "encapsulating" process protects the fatty acid in safflower oil against saturation by micro-organisms in the cow's rumen and enables it to reach the milk in unsaturated form.

ARS engineers have devised a method for quickly blanching large quantities of vegetables without boiling or steaming away valuable nutrients. Called IQB, for Individual Quick Blanching, the process has been tested in commercial canning and frozen food processing plants. Instead of exposing deep piles of vegetable pieces to steam or hot water, IQB applies a small amount of steam to a single layer of vegetables and then piles them into an insulated chamber where their heat penetrates each piece and stops enzyme action. By keeping nutrients out of the steam or hot water and in the vegetables where they belong, the IQB process also prevents serious nutrient pollution of plant sewage and other waste water output.

ARS-sponsored research by a team of University of Wisconsin scientists indicates that calcium metabolism is affected by the amount of protein consumed in the diet and that high intakes of protein can increase the need for calcium to a point where the food eaten does not supply enough calcium for body needs.

The studies show that the amount of protein in the diet may be more important to the body's calcium needs than the amount of calcium ingested. When young adult males were fed diets containing varying amounts of calcium and protein, subjects who received a high-protein diet excreted increasing amounts of calcium in the urine, thereby contributing to a calcium shortage. Although subjects on the high-protein diet absorbed more dietary calcium, the net result was a decrease in calcium retention. Every subject

excreted less calcium when partaking of the low-protein diet compared to the medium and less when fed the medium-protein diet compared to the high.

Results of these studies indicate that, with the continued increase in protein consumption in the United States, more research is needed to examine the relationship between protein intake and calcium retention.

A process developed by two ARS cereal chemists for making highly nutritious protein-enriched bread will be available under a public patent.

The protein content of bread is increased about 70 percent by this process, and the concentration of lysine, an essential amino acid in nutritionally adquate human diets, is tripled.

Using the new process, as much as 16 percent soybean flour or any other protein-rich, high-lysine concentrate can be added to wheat flour to produce the high-protein bread. The secret is the addition of glycolipids (complexes of carbohydrates and fats) without which the proteins of wheat and soybean flours are incompatible.

The high-protein bread can be used in the developing countries as well as in the United States as a principal source of protein for children and adults whose diets are nutritionally deficient and who depend upon bread as a major food.

Good-tasting and long-lasting powdered whole milk has been developed by ARS chemists. When first made, it tastes as good as fresh milk, and it still tastes good after 6 months of refrigeration. Even without refrigeration, it retains an acceptable flavor for months. To make the new product, scientists deodorized the milk fat separately, recombined it with skim milk previously pasteurized at moderate temperatures, and finally concentrated this recombined milk and dried it using a special foam-spray process. These steps effectively stop "oxidized," "cooked," and "coconut" off-flavors from developing in dried whole milk during its processing and storage.

Sweet sorghum may someday join sugar cane and sugar beets as a major source of crystalline sugar, thus opening up new areas to sugar production. The key is an ARS chemist's discovery of a way to remove the starch from sweet sorghum by modifying procedures used in making sugar from cane.

Although sweet sorghum has been recognized as a potential source of sugar for almost 100 years, a lack of good varieties and a practical technology for recovering the sugar have prevented its use.

Neither of the two sugar production methods in use today—one for cane sugar, the other for beet sugar—will effectively remove the large quantities of starch found in sweet sorghum juices. At the high temperatures necessary in production, the starch granules gelatinize and so thicken the syrup as to reduce or completely prevent sugar crystallization.

An easily managed crop, sweet sorghum requires little labor and little water. The yield is about 20 tons of stalks per acre, with raw

sugar estimates ranging from 180 to 230 pounds per ton of stalks.

Now, in addition to the method for removing starch, promising new varieties of sweet sorghum are being evaluated.

The war against hunger has taken many roads, including roads to the inner city. Getting food from wholesalers to inner-city groceries has been a costly business, and ARS marketing specialists have outlined a new, less expensive, and more efficient system for making the deliveries. It calls for centralized wholesale operations and consolidated wholesale delivery schedules, improved refrigeration equipment in the delivery trucks, and more unloading space at the grocery stores. If these and other ARS recommendations were adopted and developed, inner-city grocery stores could offer a greater variety of food at lower prices, and that could mean better nutrition for resident customers who often have nowhere else to shop.

Food Composition Data Bank

A nutrition data bank has been established in response to consumer demands for more information on food composition. The data bank will be part of a proposed National Data Center for Food Composition to be developed through industry and Government cooperation.

The ARS publication "Composition of Foods," which gives the nutrient composition of more than 2,500 food items, will form the nucleus of the data bank. This information will be published in loose-leaf form to facilitate updating as new data become available. The information will also be fed into the computer storage bank. Ultimate aim of computerizing data is to include food values by variety, breed of plant, stage of maturity, growing season, and geographical location. Nutritional data will be given for raw products, fresh or processed food in consumer markets, and food prepared for eating.

Imitation Food Products

Economy, health concern, appeal, newness, and calorie concern are some of the factors relating to consumer acceptance of such imitation food products as whipped toppings, orange drink powders, nondairy coffee creamers, sugar substitutes, and bacon-flavored soy protein bits. No single product characteristic or appeal seems likely to bring about general acceptance of future imitation products. These are findings of a survey of over 1,100 families in the greater Philadelphia area by researchers at Pennsylvania State University Experiment Station.

A SAFE SUPPLY OF FOOD

One of the Department of Agriculture's major objectives is to help provide for the people of this country—and as far as possible for people of other countries—a sufficient quantity of safe and nutritious food. The meat and poultry inspection programs fulfill that part of the objective aimed toward protecting the wholesomeness of meat and poultry products for human consumption.

Meat and Poultry Inspection

One of the important achievements of the Meat and Poultry Inspection Programs during fiscal year 1972 was the realignment of structure that helped to provide closer coordination and surveillance of meat and poultry production from farm to market as well as closer cooperation with State inspection programs.

Changes in field operations, beginning during fiscal year 1971 and culminating during 1972, established 36 area offices that report to five regional offices. The new arrangement cuts operating costs, improves program coordination, and provides a more direct line of Federal-State communication and cooperation.

The transfer of the inspection program within USDA to a new agency, the Animal and Plant Health Inspection Service (APHIS), fixed responsibility under one administrator for meat and poultry inspection and animal disease control to provide a more effective and continuous checking system for meat and poultry.

On June 30, 1972, meat inspection systems in 45 States and poultry inspection systems in 34 States were certified "equal to" Federal requirements. Meat plants selling their products only in intrastate commerce in Kentucky, Nebraska, the Virgin Islands, and Guam were placed under Federal inspection during fiscal year 1972. And intrastate poultry plants moved under federal inspection in Kentucky, Nebraska, Pennsylvania, the Virgin Islands, Guam, and Puerto Rico.

By the end of the fiscal year 3,282 meat plants, 723 poultry plants, and 869 combination plants were operating under federal inspection. During the year, USDA inspectors examined 92.6 billion pounds of meat and meat products and 28.6 billion pounds of poultry and poultry products. Some of the total represents meat or poultry counted more than once because these products are inspected at various stages of processing to help assure a clean, safe food supply.

Meat and poultry products found to be unwholesome, adulterated, or mislabeled are removed from human food channels before they leave the processing plant. Federal inspectors during 1972 condemned 99 million head of poultry and 377,000 meat animals, 13 million parts of meat animals, 40 million pounds of processed meat products, and 29 million pounds of processed poultry products.

As a second line of defense against unfit products in consumers' marketing channels, USDA compliance officers detained approximately 9 million pounds of suspect meat and poultry in 700 actions during fiscal 1972 to prevent fraudulent or illegal practices once products leave the processing plant.

During the year, USDA stepped up its laboratory monitoring to guard against meat and poultry contaminants. About 5 million pounds of meat and poultry containing illegal residues were condemned. A new mandatory program of certification for diethylstilbestrol use was put into effect during this period, significantly increasing the number of samples analyzed.

Standards for product composition and labeling requirements are important phases of the inspection system. During the fiscal year, USDA labeling specialists examined for accuracy and completeness 171,223 label designs submitted for required advance approval. Of these, 325 were rejected and 16,481 were sent back for changes so they would not confuse or mislead consumers.

Major proposals during this period included one to require that at least 70 percent of a representative slice of bacon be shown in "windowed" packages instead of just a meaty edge of the "shingled" bacon; another to require all cured meat products to show those ingredients used in the curing solutions; and others to allow sodium acid pyrophosphate (SAPP) in cooked sausages and sorbitol in frankfurters.

Federal Grading Inspection

The following shows the estimated volume and percentage of selected agricultural products officially graded for quality by Federal-State graders in the year ending last June 30:

14 billion pounds of beef—65 percent of total production.
409 million pounds of lamb and mutton—77 percent.
1.8 billion pounds of turkey—96 percent.
6.2 billion pounds of chicken and other poultry—76 percent.
1.9 billion dozens of shell eggs—30 percent.
2.3 billion pounds of dairy products—including 71 percent of the butter and 53 percent of the dry milk.
59 billion pounds of fresh fruits and vegetables—50 percent.
4 billion pounds of frozen fruits and vegetables—80 percent.
8 billion pounds of canned fruits and vegetables—40 percent.
9.8 million bales of cotton—96 percent.
1.6 billion pounds of tobacco—94 percent.
10.6 billion pounds of rice—95 percent.
388.4 billion pounds of grains—66 percent.

To increase consumers' understanding of different grades for foods, the U.S. Department of Agriculture expanded its educational program, "USDA Grades to Help You Choose."

The "How to Buy Food" series of publications, which explain what the grades mean and how consumers can shop better by knowing quality, now numbers 16—covering the various meat, poultry, dairy, and fruit and vegetable products. Six of these publications are now also available in Spanish. A bilingual (Spanish-English) booklet consisting of simplifed information on 31 food products, for use in consumer education programs, has been distributed to educators.

In efforts to reach more and more consumers, USDA also prepared a leaflet describing the "How to Buy Food" series for special distribution by the Consumer Product Information Center. Radio spots which publicize this booklet are being used by stations throughout the country as public service announcements.

Foreign Inspection Systems

In each foreign country eligible to export meat or poultry to the United States—that is, those with inspection systems equal to this country's—specific plants are certified by their governments for these exports. During the year there were 1,059 of these certified foreign plants. Foreign Programs Officers from USDA's meat and poultry inspection services visited each certified plant at least once during the year. These officers check to make sure provisions of the approved foreign inspection system are being applied in the individual plants.

The staff of 19 Foreign Programs Officers includes seven stationed permanently in key exporting countries. During the fiscal year, these officers made 2,770 visits to certified plants. APHIS is working now toward the goal of visiting major exporting plants at least four times a year.

During 1972, USDA also checked the meat inspection programs of El Salvador and the Pacific Trust Territory and the poultry inspection of Hong Kong. After careful consideration, these countries were declared eligible to export to the United States. These actions brought to 44 the number of countries eligible to export meat to this country and to three the number eligible to export their poultry products.

MUCH REMAINS TO BE DONE

The war against hunger has not been won for all Americans, but recent breakthroughs have helped thousands of our citizens on the way to better nutrition

Ours is one of the very few nations in the world where a goal of wiping out hunger from all citizens could even be considered. The constructive uses of this Nation's resources—both our productive capacity and our capacity to channel that production into hungry stomachs—has placed the President's goal much closer than was thought possible a decade ago.

Much remains to be done. More hungry people need to be fed. Other people need to be reached with information necessary for well-balanced diets which provide the only path to good and sustained health.

America's farmers have always responded to production needs, and now the American taxpayer has demonstrated clearly that he, too, is willing to do his part in seeing that the production of our farms and ranches is channeled into human stomachs—not storage bins. A healthier, happier, more productive Nation will surely be the result of our continuing war against hunger.

CREATING OPPORTUNITY IN RURAL AMERICA

Increasing numbers of Americans are indicating in public opinion surveys they prefer to live in nonurban areas of our Nation. For several years these surveys have shown more and more parents feel the rural areas of the United States are preferable to urban areas for raising children.

The term "rural America" includes a wide variety of places and living conditions. It is the farms and ranches of the United States. It includes the rapidly growing numbers of nonfarm rural residents who prefer to live in the country rather than in towns or cities. It is also the small towns and cities that dot the Nation's landscape.

Whatever its form, rural America has represented solidarity, independence, strength, industriousness, and a good life for most people who ponder the opportunities there. It's here where most food for our Nation is grown and where most of us vacation, sight-see, and enjoy peace and quiet.

Changes have been occurring in rural America since before the pioneers pushed west of the Alleghenies. Chief among those changes has been a declining population as fewer farmers are needed to produce our food. This change began in World War I and accelerated after World War II when capital replaced labor as the major ingredient in production agriculture.

During the decade of the 1960's an average of 104,000 farms in the Nation were lost every year. Through farm programs which fit the demands of more farmers and provided record net farm income, that loss in farm numbers has been cut to less than half.

President Nixon has called for a rebirth in rural America, saying the rural areas and small towns and cities, "Make up the heartland of America." He maintains there is a "heartland" in every State regardless of location. The President seeks a balanced national growth.

American citizens constantly seek improvement in their lives and in the lives of those around them. The thrust toward a better quality of life adds new dimensions to opportunity in rural America, where nearly unlimited opportunities abound. Rural development activities of the Department of Agriculture are making the use of land by nonfarmers a growing source of income for farmers and are opening up a vast range of economic, cultural, and recreational opportunities for all the people of America.

Private capital is moving into viable rural communities. The flow of people from rural areas to overcrowded cities is being checked.

Through active programs USDA is helping create the quality of life and the kind of opportunities that will encourage citizens who prefer to do so to lead fruitful lives in the countryside.

DISCOVERING OPPORTUNITIES

National concern about environmental problems has focused increasing attention on the imbalance of population patterns and economic activity across the country. The great agglomerations of metropolitan population hug the coasts while much of Middle America is relatively sparsely settled. Metro centers account for most employment opportunities. But some of these trends are changing.

In concert with national leadership—in Congress and the Executive Branch of Government—the Department of Agriculture has given strong support to rural development. This is a people-building effort to enhance the well-being of rural people and to make living and working in rural America a viable part of the goal of balanced national development. To undergird the rural development thrust, economic and social research has provided useful intelligence for better planning and decision-making. Communities everywhere are seeking assistance of this kind.

Research Highlights

Despite geographic maldistribution of population and a decline in the number of farms, people are moving beyond urban centers in choosing places of residence. From 1960 to 1970 the nonfarm population in nonmetropolitan America grew faster (19.3 percent) than the U.S. total population (13.3 percent), and even exceeded the total metropolitan growth rate (16.6 percent). This trend among nonfarm people toward nonmetro location has been fostered by a higher rate of employment, especially in manufacturing, in nonmetro than in metro areas in the past decade. For example, in manufacturing jobs the growth rate in nonmetro areas was nearly three times that of metro areas, and in contract construction the nonmetro gain was 4.6 percent while metro gain was 2.9 percent.

A study has found that incorporated communities in nonmetropolitan America have shown general stability over the two decades, 1950 to 1970. The total number of such places increased from 12,800 to 13,800 in the 20-year period, and the total population gained 29 percent. While there are differences among size classes of towns, with larger towns growing faster or being more likely to grow than smaller ones, overall stability is indicated by the fact that among those that shift in size, more than twice as many move up to larger size classes as move down to smaller ones. While many small towns have lost or changed their original functions, they cannot be dismissed in the consideration of alternative public policies on population distribution.

Another facet of rural development investigations is the relationship of where people live and where the jobs are. A study conducted for the Senate Committee on Agriculture found that commuting to urban centers for employment was not a feasible option for a larger share of our population than earlier estimates had suggested. In more than half of U.S. counties (1,718), some 24 million people or 12 percent of the total population, lived beyond the commuting field as defined in this study. The rural, small-town counties in which these people live are heavily concentrated in central United States and in many parts of the West and South. It is in these areas that poverty is deeper, housing is poorer, and local governments are struggling against increasing burdens. Federal programs that invest in people are not reaching these counties in proportion to their share of the total need. It is areas such as these that are seeking rural development assistance.

An important part of individual and community well-being is the quality of housing. Studies show that housing in nonmetropolitan America has improved considerably in the past two decades, due in part to rising family incomes. Another factor contributing to improvement is that in nonmetro areas, from 1950 to 1970, there were more new housing starts and more renovation undertaken than there were new households formed. During this period, there were 10.1 million new housing starts in nonmetro areas while only 1.2 million new households were formed. Thus the difference of 8.9 million units accounted for 7.2 million substandard units that were replaced and 1.7 million lost by fire, demolition, or other causes.

Overall, research findings reveal a mixed picture of gain and loss. Many problems—poverty, inadequate social services, too few jobs—remain unsolved in many rural areas. However, most of the structural adjustments in agriculture and mining, which stimulated heavy rural outmigration, have been completed. Recovery of economic activity and reversal of population loss have occurred in large parts of the South and other scattered areas. Multicounty areas in a majority of the States have found ways of working together in planning for community improvement and development. Research supports these efforts.

Increasing the Income of Limited-Resource Farmers

The problems of inadequate farm income are also being attacked through a program aimed at finding individual low-income farming operations. Many USDA agencies have programs to help low-income farmers, and they are continually expanding these programs. One of the key difficulties is finding these farmers and reaching them with available programs.

The Extension Service has used "agricultural aides"—farmers living in the area, respected and known by low-income farmers—to successfully reach and help these farmers increase incomes in pilot projects in several States. This method of supplementing the efforts

of county Extension agents to reach low-income farmers will probably be expanded.

Cooperative Extension programs show increasing concern with helping people know how to live better as well as how to earn a living. One way Extension helps in this how-to-live aspect is to work with local communities on problems calling for community consideration and group decision.

Virtually every county in the Nation received assistance from Extension on one or more aspects of rural development in 1972. The table below shows some of the major types of rural development programs, number of counties and projects receiving assistance, and the number of man-years devoted to the particular aspect of rural development.

Program Thrusts	Counties Assisted	Projects Assisted	Man-years Devoted
Leadership and Overall Community Development	2,532	8,407	363
Comprehensive Planning	1,697	3,301	130
Water, Sewer, and Waste Disposal	1,776	5,481	96
Housing	1,607	2,643	133
Health and Welfare	1,494	3,287	184
Manpower Development	944	1,228	38
Recreation and Tourism	1,834	3,419	104
Environmental Protection	2,029	3,926	138
Business and Industrial Development	1,262	1,796	62
Taxation and Local Government	1,472	1,491	43
Other Rural Development Activities	1,807	6,044	130

Housing

The Cooperative Extension Service has provided continual guidance and support for a self-help housing program in St. Marys County, Maryland. It is estimated that 21 percent of the houses in the county are in deteriorated or dilapidated condition. Residents still must pay up to $181 rent per month. Many groups have attempted to deal with the housing problem in St. Marys County.

A major breakthrough came with the incorporation of a private, nonprofit housing corporation which purchased land for 90 housing units to be built on a self-help plan. This program has enabled low-income residents to occupy three- to four-bedroom homes for $13,000. These same homes would sell commercially for $20,000 to $23,200. Self-help construction reduced the costs.

The project is a joint effort sponsored by Federal and State agencies, the Farmers Home Administration, and a local church group. A master builder has been employed to supervise the project. In addition to working with the residents in the construction phase of the program, the Extension Service provides pre- and post-occupancy training for the owners. Fourteen homes have been completed and occupied; applications for funding 16 more units are being processed.

It was mutually agreed in 1972 that the Extension Service and the Farmers Home Administration would establish cooperative working arrangements whereby educational services would be provided for FHA borrowers and prospective borrowers.

Under terms of this agreement, Extension assigned a staff member to function as liaison with the FHA at the national level in areas where mutuality of interest exists. Extension also is encouraging State Extension Services to work with FHA staff to acquaint them with home economics programs, obtain and provide information to families concerning resources of FHA housing, and provide educational information through group meetings and home visits to assist families in making decisions about home maintenance and financial management.

Extension also is including borrowers' families on mailing lists for publications, inviting borrowers to participate in workshops that might be applicable to their needs, and working with FHA borrower families through Extension nutrition aides where families have problems in food and nutrition.

The following are examples of the cooperative educational efforts of Extension and FHA:

County extension workers in Tennessee cooperated with FHA and Housing and Urban Development in programs of housing code enforcement. Work included upgrading or repair of older homes and construction of new homes. Reports indicate assistance to 1,766 families: 208 assisted with new homes, 931 with remodeling, 627 with planning.

Ten low-income families in Cherokee County, Texas, built new homes financed through FHA. An Extension agent worked with the families to assist in the selection of interior materials. The contractor offered prize money for landscape beautification. Response was so good that money has been provided for the contest next year.

In Mississippi, the cooperation of FHA and Extension resulted in families in 82 counties being informed regarding qualifications for financing improved housing. Every county has families who have built new homes as a result. One county reported 20 families built new homes and 11 others remodeled theirs. In another county 26 families referred to FHA have built new homes.

FHA and Extension in Missouri cooperated in the development and promotion of 15 low-cost housing plans which FHA will finance. Feedback from families, builders, and staff brought adjustments to the original plans as well as supplemental guides on

interior design and landscaping. The coordinated efforts have resulted in quality housing at low to moderate cost.

Extension housing programs in 25 Texas counties were conducted jointly with FHA, low-rent public housing, Office of Economic Opportunity, and other agencies and organizations as a means of providing information and assistance to 962 families.

Community Facilities

People who think the community decision-making and action process is too slow to ever get anything done haven't visited Stillwater County, Montana. Faced with the imminent closing of the local nursing home, the people in the county looked at alternatives and made a decision.

It was in early April 1972 that the Montana State Health Department condemned the old Columbus Guest Home. The owners were given until June 1 to bring it up to standards or close it.

Community leader Mrs. Thelma Shaw and others appealed to the county Extension staff for help. County Extension Agent Chuck Egan stepped in. About mid-April a community meeting was called, the problem was defined, and alternatives were discussed. It was the first of a series of six meetings over the next few weeks.

After several meetings, frustration was mounting and time was running out. The community (4,600 population in the county; 1,200 in Columbus) had still not hit on a suitable solution. Finally, a couple who operated nursing homes in other parts of the State agreed to come out and look into the situation. They offered to build and operate a new home. The State health department granted a 6-month extension on the closing of the present home, and construction is beginning on a new 74-bed facility to replace it.

The county agent provided guidance and organization skills and brought in outside resources throughout the decision process. Mrs. Shaw said she is "happy to see Extension going in this direction (helping with group decision-making)."

Economic Development

The Extension Service helps Alabama counties inventory and make economic feasibility studies for potential industrial clients. Extension made a preliminary economic evaluation of the opportunities for developing additional lumber finishing facilities in east central Alabama. This contributed to a $500,000 expansion of a wood products firm located in the study area.

Kentucky Extension workers provided significant assistance to 25 industrial development committees with organization and training, 25 with securing or developing industrial sites, and 13 with direct solicitation of new industries in fiscal year 1972. These

resulted in 1,403 acres of new industrial sites being secured in 22 different locations. Extension workers helped six industrial development corporations with financing plans and seven with leader training involving 95 leaders. Individual assistance was given to 139 industrial development leaders. Fifty-four business managers were assisted in obtaining management assistance through the University of Kentucky College of Business and Economics.

The Louisiana Extension Service conducted a statewide survey of vacant buildings suitable for industrial use. Pertinent information about the buildings was compiled and turned over to the State Department of Commerce and Industry. As a result, local committees were formed in several communities to attempt to attract an industry. Following this inventory, seven new industries located in rural areas during the past year. Training meetings have been conducted in several communities to help gain understanding of the necessary ingredients of an industrial development committee or board.

Recreation Fosters Small Business

America's rural areas provide exceptional opportunities for small business enterprises. The urge of citizens to just go takes them to some far away places where waters, forests, open spaces, and scenic values abound.

The major National Forest recreation activities, which generate small business involvement, occur through direct concessioner operation of sites and facilities on or near recreation sites. Concessioner facilities and services include hotels, motels, trailer sites, restaurants, stores, and gasoline stations. In 1972, the Forest Service had about 1,500 concessioner permits in force for the construction and operation of recreational facilities and to provide recreational services. Additionally, 300 concessioners operate on sites maintained by the Forest Service. All Forest Service-developed recreation sites can accommodate 1.3 million people at one time. Thirty-five percent of this capacity is made available by the small business entrepreneurs who are Forest Service concessioners.

Creating Jobs

An Oklahoma Agricultural Experiment Station study shows that processing of agricultural products creates more jobs than any other industry. A new plant to process farm and ranch products will result in 5.25 additional jobs for every person initially employed. To create 100 new jobs, an investment of only $205,000 is needed, the lowest of any industrial grouping. Transportation, communications, and public utilities industries require over 10 times the investment of agricultural processing to create 100 jobs. The petroleum industry has an employment multiplier factor of

6.25 but requires a $1 million investment to create only 12 jobs. The only drawback is that the Nation's potential growth in agricultural processing is slow and limited. The study also shows that crop production, because of mechanization, has the lowest long-run job multiplier on the list—0.72. Livestock production is more promising, with a long-run job multiplier of 2.05.

Building People

A breakthrough in manpower development programs in 1972 was Operation Hitchhike. The Department of Agriculture and the Department of Labor developed plans for the delivery of manpower services to residents of rural areas through their cooperative effort. State Extension Service and State Employment Service personnel make information counseling and job referral services available. In Algona, Iowa, for example, 286 job applications were received during the April-June quarter. Of these, 226 were referred for training or employment and 77 were placed in nonagricultural jobs. Similar activities took place in the other 13 States participating in Hitchhike.

Extension serves as the USDA coordinating agency for a local-Federal-State cooperative effort known as Concerted Services in Training and Education (CSTE). There are 18 program areas in 14 States. Reports indicate that twice as many rural people are participating in one or more education, training, or job development activities in the CSTE areas as in other similar areas in the same States. During June in the eastern Arkansas area, 412 people were engaged in special training, education, and job development activities and 338 were placed in new jobs.

Comprehensive Land-Use Planning

The Forest Service has been doing land-use planning for many years through multiple use planning, individual functional resource plans, comprehensive planning with the States, and the multifunctional team approach. In the past, planning usually stopped at the National Forest boundary; however, Forest Service daily decisions have long-term effects on lands other than National Forests. Likewise, States and counties make decisions that have long-term effects on the National Forests. Natural resources are interrelated; the formulation of an optimum land-use policy cannot stop at boundaries, but needs to be made in conjunction with State and local planning units.

The Forest Service recognizes the need to cooperate with local jurisdictions in the planning and proper use of the 78 percent of the commercial forest land in other than Federal ownership. For several years, the Forest Service has been involved with the State foresters in providing this necessary land-use planning assistance for orderly

development and guidance to State planning agencies and other sub-state planning units. The following summary indicates this activity:

Planning Assistance

State Level	Alaska, Florida, Louisiana, Montana, New Hampshire, New Jersey, Texas, Utah, Virginia and Wyoming.
Sub-State Level	Alabama*, California, Colorado (2), Connecticut*, Georgia (2), Kentucky, Nevada, South Carolina, South Dakota, Virginia* and Wisconsin

*FHA funding

Opportunities Through Cooperation

Rural people with limited resources are using cooperatives to develop full-time jobs, increase income, and upgrade their standard of living. The Farmer Cooperative Service helps by providing advice and training on cooperative organization, management, and operations, plus technical assistance on the production and marketing of specific products. As examples, this activity supports the:

- Federation of Appalachian Craft Groups, capable of serving 7,000 craft producers.
- Project with the Small Business Administration to finance the building of a $450,000 wool and mohair cooperative processing plant.
- North Carolina Rural Fund for Development that is providing financial and technical assistance to 25 cooperatives with 12,000 members.
- North Florida Manpower and Economic Development Alliance that is helping 27 rural groups.
- Seminole Employment Economic Development Corporation that is determining the future of a nursery marketing organization.
- 140 Minnesota families who are producing specialty crops and marketing them cooperatively through 14 roadside stands.
- Formation of cooperatives by the Navajo Nation at Shiprock, N.Mex., to market the products from an irrigation project covering 111,000 acres.
- Migrant workers in California who are hopeful of purchasing a 105-acre strawberry farm where they are now working as farm laborers.

- Four Corners Regional Commission at Chimayo, N.Mex., that is assisting an apple growers' cooperative with its marketing problems.

POWER FOR PROGRESS

Few programs of the Federal Government contribute more to the social and economic development of rural areas than those of the Rural Electrification Administration. Each time a rural electric or telephone system connects a new user or provides additional services for an existing user, community development is stimulated.

REA-financed systems provide essential power and communications in 2,600 of the Nation's 3,100 counties. More than 25 million rural people depend upon these systems for a better quality of life. These independent, locally operated and managed enterprises provide jobs for more than 50,000 people. While REA itself owns no telephone or power generation or distribution facilities, and employs less than 800 people, often the REA-financed system is the largest single employer in a rural community.

Electric power loads nationwide have doubled every 10 years since 1945. Rural electric loads now double every 6 to 7 years, and by 1975 will double about every 3½ years. Rural systems sold 84.3 billion kilowatt hours in calendar 1971. They sold more power in a single month last year than they did in the entire 12 months of 1947, and they built almost 25,000 miles of new line, plus related substation facilities and services. Such service, growth, and expansion require more employees, improved management, and additional financing for system maintenance.

Examples of adding services for existing users include: walking sprinkler systems which improve irrigation and cover greater areas at lower cost; freezer facilities which preserve meat, milk, poultry, thus increasing quality and income; telephone service in a remote area of North Dakota which saved a wheat crop by summoning firefighting equipment which could not otherwise have been called in time. Every job handled with electric power eliminates farm drudgery, usually increases output, and thus increases income. Dusk-to-dawn mercury vapor lights bring the safety of illumination to rural farms, homes, and stock areas. Air conditioning and electric heating add to family comfort and to hog and cow barn productivity and profit.

Opportunity Through Development

Availability of good electric and telephone service in rural areas not only improves the quality of life for families, but also invites and promotes development. Commercial recreation projects—ski lodges, campsites, hunting, hiking, boating—industrial parks,

training a labor force for potential industry, and upgraded community facilities programs are made feasible by electricity. More rural communities are able to process the food and fiber which once had to be shipped to urban areas for processing and marketing. New businesses mean new jobs. Upgraded rural life benefits urban areas as markets for urban-produced goods and services are created and expanded.

In 1971, REA-financed systems helped launch 820 commercial, industrial, and community facilities projects which created 34,846 new jobs for rural people. This brought to 134,139 the number of jobs created in the last 3 years through borrower-stimulated local development projects which are helping reshape and revitalize the future of rural America.

Community Development Progress

REA is deeply involved with agricultural production as borrowers provide power to operate vital farm equipment on about half the farms in the United States. A significant number of agricultural processing plants and other agriculture-related businesses receive power from REA-financed systems.

Some examples of REA borrower community development aid and results:

- Edgecombe-Martin County Electric Membership Corporation, Tarboro, N.C., aided Farmers Home Administration in administrative work for 38 new FHA loans. An industrial development program spearheaded by the co-op manager created 4,005 new jobs with total annual payrolls of $16.5 million. New plants attracted to the area represent an overall capital investment of $40 million.
- West Oregon Electric Cooperative, Vernonia, Oreg., worked with the local Chamber of Commerce to locate a site and secure local financing for a new lumber mill. The mill uses more than 700 kVa of electric power, employs seven people directly, and 10 county residents supply raw materials. The co-op provides office space in Vernonia for the State employment agency which has its headquarters 40 miles away.
- The REA-financed Unity Telephone Company, Unity, Maine, was a prime mover in developing a new local area college. Enrollment has more than tripled since it was opened. The school was promoted as a community project. Unity Telephone has installed one-party service at Unity Institute, prewired to each dormitory room.

The National Rural Utilities Cooperative Finance Corporation (CFC), the Rural Telephone Bank, and other supplemental financing sources provided 40 percent of the more than $1 billion in loan funds made available to REA electric and telephone borrowers.

In the electric program, REA announced 467 loans for $438,252,999.87, committing its loan funds down to the last penny available. This amount included $393,279,999.87 for electric distribution systems and $45,973,000 for power supply. The agency advanced $418,484,069, a record high. Nationwide, service was provided for an additional 240,114 consumers.

In its 37-year history, REA has advanced $7.3 billion to electric borrowers for investment in their local facilities and almost $1.8 billion to telephone borrowers.

The Federal Government received more than $244.2 million during fiscal year 1972 in payments by REA electric borrowers on the principal and interest of their loans. These brought to $3.8 billion cumulative payments to the Government through June 30, 1972, against losses of less than one one-thousandth of 1 percent.

CFC—established and owned by REA-financed rural electric systems—loaned its members $133.2 million in its first full fiscal year of operation.

REA will continue to meet the objectives of the Rural Electrification Act, which directs the provision of vital electric and telephone service to rural people who desire these services. For example, an REA-financed telephone cooperative in North Dakota brought telephone service to 93 families in a 1,000-square-mile area of western North Dakota and eastern Montana, opening a new frontier to worldwide communications. Ranchers and farmers of this remote region could communicate with their neighbors only via citizenband radio.

The Reservation Telephone Cooperative of Parshall took on the responsibility of building a telephone exchange in Squaw Gap, N.Dak.—a dirt road intersection with eight buildings—after others found it financially impossible.

Squaw Gap typifies the excellent cooperation which strengthens the entire telephone industry. The area would still be without telephone service if Northwestern Bell, the Public Service Commission of North Dakota, contractors, and equipment suppliers had not given this project every priority. Already, one prairie fire capable of destroying a season-growth of wheat, was conquered by 100 men summoned by telephone relay.

Aside from expanded needs for new rural nonfarm residents, the electric demands of farmers and ranchers continue to grow and currently they use more electricity each year than is used annually by the cities of Baltimore, Chicago, Boston, Detroit, and Washington, D.C., combined.

THE RURAL DEVELOPMENT ACT

The Rural Development Act of 1972 became law on August 30 to provide many challenges for better service and new opportunity to rural America.

The new program calls for additional staff members and broadened funding, and various agencies of the USDA will be involved in carrying out the Act. The Farmers Home

Administration is given the authority to make:

- Rural Enterprise loans to help establish small businesses in communities not larger than 50,000 people and to finance operating expenses of such businesses.
- Loans to Rural Youth to enable them to operate enterprises in connection with their participation in 4-H Clubs, Future Farmers of America, and similar groups, with the young borrower authorized to assume liability either by himself or with a cosigner.
- Essential Community Facilities loans to public bodies and nonprofit associations in towns of up to 10,000 people for such vital improvements as fire halls, community centers, and industrial parks and for purchase of firefighting equipment, ambulances, and related items. The existing water and waste disposal program is extended to rural communities of up to 10,000.
- Rural Industrialization Assistance loans to individuals or to profit or nonprofit organizations to develop business and industry and provide employment for improving economic and environmental conditions in communities not larger than 50,000 population.
- Pollution abatement and control grants, amounting to not more than 50 percent of the total cost, for projects associated with farming and small business loans and to assist applicants to meet environmental standards.
- Comprehensive planning grants to public bodies or planning agencies seeking to draw up master plans for rural development activity in communities of up to 10,000 population.
- Business and industry grants to public bodies seeking to attract new employment-producing businesses.

The Act also establishes a rural development insurance fund to support the business and industrial loan and grant programs, provides for guaranteeing housing loans to families with above moderate income, and increases the amounts authorized for grants to build water and waste disposal systems and to plan such systems.

Rural Community Fire Protection

The Act authorizes the Secretary of Agriculture, through the Forest Service, to assist in the organization, training, and equipping of local firefighting sources in rural areas presently unprotected or poorly protected.

Pertinent features of this provision are:

- It is a 3-year pilot program.
- Financial assistance is not to exceed 50 percent of total costs.
- It will be accomplished with and through State foresters or other appropriate State officials.

- Authorizes appropriation of $7 million for fiscal years 1973, 1974, and 1975.
- A report is to go to the President after 2 years of program operation.

When funds become available, it is contemplated the program will be administered through cooperative agreement with each State forester. He will receive applications for projects and will supervise the activities of any project which receives Federal funding under the Act.

The program is concerned with the 420 million acres of cropland, farmsteads, and pastureland and improvement thereon located between the urbanized area and the area that is eligible under the Clark-McNary program. Assistance basically will be rendered to small-town (up to 10,000 in population) fire departments to improve their capabilities to handle rural wildfires and structural fires. State foresters will approve projects. Applications will go to the Forest Service for approval and cooperative funding. Assistance will then be provided in organizing and training of volunteer fire departments and crews, as well as assistance in purchase of equipment.

The Rural Development Act provides many challenges and opportunities in rural America, and 1973 promises to be the first of many years of renewed activity in helping rural Americans live fuller, happier lives.

AGRICULTURE AND THE ENVIRONMENT

Few Americans realize that our Nation's farmers were the first ecologists. Most of our people think preserving our natural resources and improving some that have been neglected is a relatively new idea. To the contrary, farmers have been cleaning up the environment for more than 50 years for very personal reasons—they live closer to nature than anyone else and know their living must come from life-producing soil and water.

Nevertheless, we must strike the best possible cost balance, and the best possible risk-benefit ratio, as we increase agriculture's dimensions and weigh our environmental concerns. Reason, common sense, and understanding will enable us to do so—and will enable farmers to ride high on the surging tide of agriculture.

After years of unprecedented scientific progress, some of our most beneficial achievements now stare us in the face as problems.

DDT must have a replacement. Society has decided that we must now find something as effective yet safer.

Diethylstilbestrol (DES) must have a replacement. Society has decided that we need to find something equally as effective and as cheap—if we can—yet with no risk. And we need to find a way to dispose of the added 2 million tons of manure which will result from having to feed beef cattle longer and less efficiently to get the same amount of beef we have today. Waste, of course, is bound to increase as the push for greater production intensifies.

We must find more effective ways to fertilize, with less possible side alteration of the environment. These environmental challenges will not subside in the years ahead—they will mount.

In addition to our concerns with animal health and production levels, we have a problem with predators. Predator control is becoming more and more critical as chemical use is restricted. At this very time when consumers are complaining about high meat prices, and when greater production is needed to keep prices in line, our domestic sheep industry faces a survival crisis because traditional methods of controlling coyotes are being denied to it. And if coyotes and other predators should increasingly turn from lambs to calves, our beef industry would also be in for real trouble.

This is why researchers are giving high priority to developing alternative controls. Studies have been initiated by the Department of Agriculture at Beltsville, Maryland, and through cooperative agreements with the States of Texas, Colorado, Wyoming, and South Dakota. A main thrust of the work is to find an effective predator repellent.

We must mount a total systems approach to cope with the situation. State and Federal researchers in animal husbandry, agricultural engineering, soil and water conservation, and all related disciplines will have an important part to play in a concerted attack on environmental problems. We hope that they will develop answers that will enable producers to meet the pressures brought on them by the insistent demands for pollution control.

STUDIES UNDERWAY

In 1972, we made economic impact studies dealing with pesticides and animal wastes. These follow on the heels of previous impact studies on the organochlorine insecticides, the phenoxy herbicides, and livestock feed additives. Our findings in brief are shown below.

DDT on Cotton

Cotton has been a heavy user of the insecticide DDT. Cotton has accounted for three-fourths of the DDT used by U.S. farmers. The suspension of DDT use and substitution of other insecticides will double the cost of cotton insect control to about $110 million annually. Use of toxaphene on cotton will double, and the use of methyl parathion will increase about fourfold. The study found that many cotton farmers have been using 15-20 percent more DDT under a regular spray schedule than would have been needed under a "use when actually needed policy."

Aldrin and Dieldrin

These pesticides are used for controlling soil insects, chiefly in corn. We use about 10 million pounds of the materials in treating 9 million acres. Use of these insecticides has declined in the western Corn Belt where corn rootworms have developed resistance to them. However, discontinuing the use of aldrin in corn production would increase production costs about $30 million.

Chlordane

This is an insecticide used to control soil insects such as rootworms and wireworms. The total added cost to U.S. farmers for discontinuing the use of chlordane in 1971 would have been $1.8 million—$1.5 million for substitute insecticides and $0.3 million for a loss in crop yields. Substitute materials are less than fully effective on strawberries and some vegetables. The added cost of substitute materials would be nearly $7 an acre for corn and would average

about $2.50 higher for potato, tomato, vegetable, and strawberry crops. Yield losses would be about $23 per acre for vegetables, $31 for citrus, and $75 for strawberries. Eliminating the use of chlordane would actually increase the total quantity of insecticides used (for the same purpose) by about 1.1 million pounds. This analysis does not take into account nonfarm use of chlordane.

Phenoxy Herbicide 2,4,5-T

This herbicide is fully effective as a control against a wide variety of persistent weeds in the rice culture of Mississippi, Louisiana, and Arkansas. Control of weeds with 2,4,5-T on 100,000 acres of rice costs about $430,000 annually. With alternative herbicides the loss in yield and quality of the crop would rise to $4,720,000, a loss of about $47 per acre.

Heptachlor

This is an insecticide used on corn land to control soil insects (rootworms)—about 630,000 pounds on 670,000 acres. Without the use of heptachlor, corn growers would suffer annual losses of about $2.0 million—$1.1 million added cost for alternative insecticides and $0.9 million in crop losses due to insect damage.

Water Pollution Abatement on Family-Size Livestock Farms

Half the dairy herds, half the beef raising herds, and half the cattle feeding enterprises in Illinois involve less than 20 head of animals. In fact, 80 to 90 percent of the cattle enterprises involve fewer than 50 head. Furthermore, such farms usually contain substantial land acreages and they are often interspersed with cash-grain farms (without livestock), hence the density of animals per square mile is comparatively low in most areas. We see little difficulty in cost of compliance with pollution abatement measures on most family-sized farms in Illinois, for example, and the Corn Belt. However, the requirements for drainage control and animal waste storage for a 500-head hog open-lot operation could entail new investment as high as $15,000 to $20,000, plus annual costs of $6 per head.

Feeding Value of Hog Wastes

Growing-finishing hogs digest about 85 percent of a corn-soybean meal ration. The other 15 percent of the nutrients plus most of the minerals are excreted. Such wastes traditionally have been used to

fertilize cropland. However, the problems of odor and runoff, in the face of low-cost commercial fertilizers, and the increasing size of hog enterprises relative to land holdings, have now reduced the attractiveness of that practice. Feeding hog wastes is an alternative to their use as fertilizer.

Research evidence, though incomplete, indicates that recycling hog wastes into the feed supply has economic potential, but chiefly for the very large producers of hogs grown entirely in confinement. The wastes when oxidized and otherwise processed can replace 60 pounds (15 percent) of the soybean meal in a ton of hog feeding ration, a saving of up to $2.35 per hog grown out from the 40-pound feeder pig to the 200-pound market hog.

Recycling the waste would have little to offer to most of the existing hog producers without a substantial increase in size of operation and a modernization of their present facilities.

ENVIRONMENTAL RESEARCH RESULTS

Cows Reduce Cadmium Consumption

Cadmium, a highly useful metal, is becoming widely distributed in our environment. High amounts are very toxic to all animals and humans. Protecting the human food supply from excess cadmium is of considerable importance.

Metabolism studies with young ruminants and lactating cows at the University of Georgia have shown that meat animals and cows are very effective in protecting the consumer from cadmium. Of the cadmium ingested by ruminants only about one part in 300 is absorbed with the other 299 being eliminated in the feces. Less than one part in 5,000 of that eaten is secreted into the milk.

Young ruminants deposit very little of the absorbed cadmium in the muscle, thus the consumer is well protected from cadmium.

A New Tree for Windbreaks

After 10 years of testing, the Japanese larch appears to be an adapted tree for windbreaks.

During the growing season, foliage density of Japanese larch in a shelterbelt is like that of any other conifer. Because larches are deciduous, however, their crowns are rather open during winter. This may be an advantage since it allows snow to blow through rather than drift within the windbreak.

The tree grows rapidly in the Midwest.

Thermal Defoliation of Cotton

Research initiated in 1962 at the Oklahoma Agricultural Experiment Station has produced a cotton defoliation method

more reliable than chemical defoliation. Defoliation as high as 92 percent and leaf desiccation of 100 percent have been consistently achieved. Ginning tests have shown that when properly applied, heat has caused no damage to the cotton lint. The use of heat to predictably defoliate cotton plants seems an ideal practice since it eliminates use of chemicals with their problems of residues and drift to adjacent crops.

A prototype thermal defoliation machine has been used successfully in Texas, Mississippi, and Oklahoma. This machine covers two rows at a time at speeds in excess of 4 miles per hour and uses LP gas as a source of heat to further minimize environmental contamination.

Lake Weeds Control

Harvesting the troublesome lake weed Eurasian Water Milfoil is proving to be the best alternative to use of herbicides or biological control in Wisconsin. Three harvests annually have nearly eliminated the plant from lakes under study. Engineers have developed a self-propelled barge with underwater cutter bar, porous conveyor and dewatering technique to prepare the material as a soil conditioner and protein concentrate for livestock feed.

Mercury-Selenium Interaction

Additional facts to clarify the problem of toxicity of certain chemicals in feed and food came from Wisconsin research with the report that selenium and mercury can counteract each other with a harmless result in animals. Feed containing as little as 1/2 part per million of selenium gave good protection against 10 parts per million of mercury in the drinking water of lab animals while those on the same diet without selenium died. Analysis of several lots of canned tuna showed that both mercury and selenium were present together. Apparently the two chemicals combined to reduce the action of each.

Getting the Stench Out of Feedlot Waste

Chopped sagebrush added to the diets of fattening steers has been found to reduce feedlot odors. The idea stemmed from research on the feeding habits of deer in Colorado. Droppings of the animals were essentially free from disagreeable odors when their stomach contents contained considerable amounts of sagebrush. The additive has no adverse effect on feed efficiency, carcass quality, or taste of the meat. Oils in the sagebrush change the makeup of the bacterial population in the animal's digestive tracts, modifying waste odors.

Bacteria Control Gypsy Moth

Pennsylvania research has reported a promising nonchemical control technique for gypsy moth infestations of oaks and other trees. Sprays of a microbial insecticide known as *Bacillus thuringiensis* reduced loss of leaves under 25 percent compared with 50 to 95 percent defoliation in untreated areas. The bacterium infects the moth larvae but is harmless to man, wildlife, and beneficial insects. The spray remained effective 4 weeks after application. Field testing is being continued.

For the first time there is hope of curing trees infected with Dutch elm disease. A water-soluble form of benomyl, a chemical that inhibits the fungus inside the tree without damaging the elm itself, has been developed along with a pressure technique for injecting the chemical into the tree. In its normal form benomyl, a systemic fungicide, is not readily taken up by mature trees.

In the spring and summer of 1972 scientists treated many diseased elms with benomyl. All trees will be examined periodically for 2 to 4 years to assess the results. Benomyl is toxic to the fungus-causing Dutch elm disease, but is not very toxic to mammals and is not nearly as persistent as DDT. With the new injection techniques, the ARS scientists believe there is little chance for environmental contamination.

Safer Pesticides Employed

In Maine, aerial application of the new insecticide, Zectran, on some 500,000 acres of fir and spruce infested by spruce budworm, a defoliator, showed good suppression results and no adverse environmental effects. The project, carried on by the State of Maine in cooperation with the Forest Service, aroused no public objections. This is a significant breakthrough in the operational use of an environmentally acceptable and safe aerially applied pesticide.

Foam Instead of Spray

This past year, Agricultural Research Service entomologists and agricultural engineers developed a foam application method for insecticides used in corn borer control. The foam carries the insecticide where the corn borers are—in the whorls and leaf axils of the corn plants—far more effectively than do spray or granule formulations. Less insecticide is needed; and nearly all of it stays on the plant, where the borers feed.

Pest Management Systems

USDA and State agencies are testing a pest management system to protect crops from pest damage by using a combination of

methods and reducing the dependence upon pesticides. The approach is to get the maximum benefit from natural controls, along with such supporting techniques as judicious use of pesticides, properly timed cultural practices, parasites and predators used as biological controls, and resistant crops.

The program started with pilot projects on cotton in Arizona and tobacco in North Carolina. In 1972, the effort was expanded to cotton projects in 14 States and on alfalfa, apples, potatoes, lettuce, sweet corn, sweet peppers, and tobacco in seven other States.

Research in Texas has demonstrated that costs of cotton insect control can be reduced by a factor of 50 to 1 or more by proper scouting techniques and management. During a 3-year trial period the station expended only $1.30 per acre for insecticidal treatment of cotton while the average producer spent from $65 to $95. Only 1 pound of methyl parathion per acre was applied in 1968, while growers made 24 to 36 treatments during the 3-year period. Good crop management, including a diversified cropping system, contributed to sucessful production. In 1972, 1,363 USDA-trained "scouts" surveyed 3.4 million acres of cotton—about 25 percent of the total cotton acreage in the United States.

North Carolina scientists have obtained effective control of the boll weevil with less insecticide by means of a diapause control program. The boll weevil survives the winter in a physiological condition termed diapause. The control program is designed to kill the weevils with insecticide applications before they enter diapause and leave cotton fields for overwintering areas. The major advantage is that fewer weevils enter cotton fields the following spring. With low spring populations, early season insecticide applications are unnecessary; therefore, total applications are fewer and control costs are less. In some trials, over-wintered boll weevil populations have been reduced 90 percent by two to four fall applications, resulting in four to eight fewer chemical applications the following year.

Another strategy that is deadly for insects—but good for the environment—is biological control. In one proposed use of this technique, ARS scientists are breeding a sort of psychological time bomb to plant in cotton fields as an unpleasant surprise for the boll weevil. The bomb is called frego bract, an odd cotton mutant with unusually narrow, twisted bracts instead of the broad, leaflike structures upon which boll weevils usually lay their eggs. Close-up motion picture studies show that the unfamiliar and difficult terrain of frego bract frustrates boll weevils and disrupts their egg-laying habits—enough to enormously reduce boll weevil populations in test fields. It may be possible to breed frego bract into high-quality cotton within the next 5 years.

Final objective is to develop an integrated system of pest control—based on sound ecological principles—that can be adapted for effective use against any plant pest on any crop. So far, participating growers have been able to eliminate one or more pesticide applications and still get better pest control.

Sterility Technique

The sterility technique has been used successfully in eradicating or controlling several insects and is under continuing study. The technique involves raising large numbers of the pest insect, treating them to cause sexual sterility, and releasing them to mate with native populations.

During the past year, an average of 1 ½ million sterile Caribbean fruit flies were released weekly in Key West, Florida, as part of a field trial to improve this sterile-release technique as a non-polluting pest control method that could be used against future invasions by some of the highly destructive fruit pests.

MEASURABLE PROGRESS

Environmental improvement is the major thrust of Soil Conservation Service work; environmental improvement that is long-term and is consistent with the physical, social, and aesthetic needs of the American people as they are supplied through the use of soil, water, and related natural resources.

SCS men in more than 3,000 field offices provided on-the-spot assistance in helping an area face its environmental and conservation problems.

SCS programs for environmental improvement include soil surveys; snow surveys; small watershed projects and river basin studies; plant material centers which, during the year, developed or adapted six plants for beautification, forage or erosion control, and 123 multi-county resource conservation and development projects.

In 1972, 34 million acres of land were adequately treated from a conservation standpoint. A few SCS-assisted conservation and environmental practices reported by landowners or operators during the year include:

43,000 acres of farmstead and feedlot windbreaks planted
398,000 acres of trees planted—in addition to windbreaks
107,000 feet of fish stream improvement work
2.3 million acres in minimum tillage
10.9 million acres in improved pasture and hayland management
53,000 ponds built
52,000 acres of recreation area improved
250 miles of streambank protection work done
7.5 million acres of wildlife habitat management
365,000 acres of woodland improvement
19.3 million acres of crop residue management.

Soil Surveys

A major effort is underway to increase the publication rate of new soil surveys. The modern soil survey is an inventory of the soil

properties of an area (often a county), together with interpretations of their behavior for various uses. Surveys are conducted by soil scientists, who go over the area, testing and sampling it acre by acre.

The soil survey is a valuable tool for all types of land users. Farmers and ranchers use soil surveys in making decisions about crops, field layout, irrigation or drainage needs, and other concerns. Sanitary engineers use soil surveys in locating suitable sites for solid-waste disposal systems. Homebuilders, planners, and zoning officials use them to help find building sites that are least likely to flood, to be damaged by soil movement, to have waste disposal problems, or to take up valuable scenic or wildlife areas.

Highway planners rely heavily on soil surveys, as do road builders, who use them to locate sources of sand and gravel. Soil surveys will show transportation planners where the soil is likely to shrink when dry and swell when wet and therefore crack highways built over it. They show utilities where soil is acid and would corrode underground pipes or cables.

Last year, 80 soil surveys were completed and sent in manuscript form to the printer—the greatest number ever in 1 year, and twice the number submitted in fiscal year 1970. The 80 surveys represented about 40.8 million acres. As of the end of fiscal year 1972, about 44 percent (815.3 million acres) of the land planned to be mapped in the United States had been mapped by modern soil surveys.

In addition, 449 special soil interpretation reports were prepared and made available for local use. These reports are published prior to the completed soil survey, and represent immediate responses to requests from communities for basic soils information for land use planning. For example, a town may request the use of a soil interpretation report in determining sites, suitable or unsuitable, for schools, developments, or sanitary landfills.

Increased interest in small watershed projects, under Public Law 566, during fiscal year 1972, was reflected in the obligation of over $66 million for construction of multipurpose dams, floodwater-retarding structures, and other water management measures. An additional $11 million was obligated for structures in the 11 flood prevention projects authorized under an earlier act. And, substantial amounts of money and effort, provided by farmers and landowners, went into improving the use and treatment of land in the watershed area, which is an integral part of all small watershed projects.

Hurricane Agnes, in June 1972, dramatically illustrated the effectiveness of the small watershed program. One hunderd and sixty-one floodwater-retarding dams and 150 miles of channel work, costing $38 million, prevented an estimated $22.2 million in direct damages from this one storm. Every SCS-assisted dam held. The structures suffered little damage and are ready to repeat their planned flood prevention function when needed.

In Pennsylvania, where all 67 counties were declared eligible for Federal disaster aid, following Hurricane Agnes, SCS was involved with seven completed small watershed projects and 14 more under

construction. Local officials of the town of Jim Thorpe, Carbon County, estimated that a quarter of a million dollars in damages were prevented by the Mauch Chunk watershed project. And in Virginia, it was reported that the Mountain Run watershed project in Culpeper County held back 1.8 billion gallons of water during Agnes. Unlike the nearby communities of Rapidan and Remington, which were inundated by floodwaters, the town of Culpeper received only minor damage from flooding.

Originally designed to help control soil erosion, reduce sediment, and prevent floods, the watershed program has been expanded in recent years to provide water supply, recreation, fish and wildlife, and other positive community benefits. Watershed projects also bring new jobs to rural towns.

Estimates of benefits gained, in 1972 and since the program began, are impressive:

1972	*Total*
$48 million in flood damages prevented	$270 million
1.8 million tons of sediment trapped	$16.7 million
$56 million in benefits from erosion control and grassland improvement	$347 million
3,050 man-years of employment from construction	22,600
7,000 new jobs created in new and expanded businesses	almost 70,000
9 reservoirs for municipal and industrial water supply	a total of 75 reservoirs serving 364,000 people in 76 towns.
16 reservoirs with recreation facilities, providing 1.1 million annual user days	101 reservoirs providing over 6 million user days in total.

During fiscal year 1972, Federal assistance in planning, pre-construction, or construction work was furnished to sponsors of 687 watershed projects. Initial agreements for construction were signed for 50 projects located in 32 States. Sponsors of 361 projects had completed the construction of all engineering measures, while 333 of these projects have now completed all planned construction and related land-treatment work.

Local sponsors submitted 42 new applications for assistance during the fiscal year. Planning assistance was authorized for a total of 1,662 projects by the end of the year, leaving a backlog of 1,273 unserviced applications.

At year's end, a total of 1,060 projects had been approved for USDA assistance, with 49 plans awaiting administrative or congressional approval.

New Plant Materials

During the past year, the following new plants from SCS Plant Materials Centers passed field tests and have been released in

cooperation with State experiment stations for commercial production:

- 'Lutana' cicer milkvetch, a valuable nonbloating legume for forage and critical-area cover in the Northern States.
- 'Emerald Sea' shore juniper, for beautification and sand dune stabilization on the east coast.
- 'Rosana' western wheatgrass, an improved variety for forage and erosion control in Montana and Wyoming.
- 'Palar' Wilman lovegrass, for forage production and cover on the desert grasslands of Arizona.
- 'Mackinaw' birdsfoot trefoil, an improved forage legume for the upper Corn Belt and Great Lakes areas.
- 'Lathco' flatpea, for erosion control, beautification, and wildlife cover on highway banks, mine spoil areas, and shaded roads in woodlands in the East.

Appropriate plant materials are a major part of any soil erosion and sediment control program.

Resource Conservation and Development

During fiscal year 1972, 20 new Resource Conservation and Development (RC&D) projects became eligible for planning assistance. Covering nearly 72 million acres, the projects are located in 21 States: Arizona, Arkansas, Colorado, Delaware, Florida, Idaho, Illinois, Indiana, Iowa, Georgia, Kansas, Maryland, Michigan, Mississippi, New Mexico, Ohio, Oklahoma, Rhode Island, Texas, West Virginia, and Wyoming. Purpose of these projects is to improve the use of each area's natural resources and the economic and social well-being of its people. RC&D areas have high potential for raising incomes and increasing community facilities.

One example is the Lincoln Hills Resource Conservation and Development Project, the first in the Nation, which became operational in October 1964. It takes in 1,005,440 acres of Spencer, Perry, Crawford, and Harrison counties in southern Indiana. For 70 consecutive years prior to the formation of Lincoln Hills RC&D, the area had been plagued by an outmigration of people. However, the 1970 census reported more than 64,000 people in the four-county area, an increase of 4,000 from 1960. Local leaders attribute this increase in part to the RC&D. Project-sponsored demonstrations in modern timber resource development for local foresters, woodcutters, and sawmill operators have brought increased income and employment. Greater economy in timber production has led to increased contracts with paper factories and other wood users. The wood-chip business alone has brought more than $850,000 to the area every year. Nearly all banks in the area tripled their deposits from 1964 to 1971, and tourism has become a major industry due to RC&D-sponsored recreation facilities and improved hunting areas.

Before 1966, there were no manufacturing jobs in all of Summers County, W.Va. Then a factory was constructed in the area, but the first two tenants were flooded out of business. Now, due to efforts of sponsors of the Mountain-Dominion RC&D Project and others, a dike more than a quarter-mile long surrounds the factory, protecting it from floodwaters of the Greenbrier River. Today nearly 100 people are at work inside the enclosure making men's and boys' clothing.

Addition of the 20 projects made a total of 98 RC&D projects underway across the Nation by the end of fiscal year 1972.

Conservation Help for Local Governments

SCS provided more than 100,000 technical services to 26,600 local and State governments in fiscal year 1972—an increase of 31.5 percent over 1971. To date, more than 1,200 local plans to guide soil and water policy decisions and to assist in orderly development have been prepared, using SCS technical assistance. About 530 local ordinances, concerned with land use and erosion and sediment control, have been put into effect.

More than 15,500 natural resource inventories and evaluations were prepared with SCS help, for a 42-percent increase over 1971. This enabled local units of governments to develop quality standards for conservation land use and treatment.

In addition, more than 2,400 public facilities, such as schools, were located on suitable soils and topography with SCS help.

Subdivision Land Clearing Sanitized

In Fairfax County, Virginia, county authorities halted haphazard large-scale urbanization that usually destroys natural forest cover, with a resulting loss of soil and scenic values and increased sedimentation. The county adopted several ordinances and policies to guide subdivision development. This led to sponsorship by the county of a small watershed project, under Public Law 566, on Pohick Creek. It's the first in the Nation on a watershed expected to be converted entirely from rural to urban use.

In July 1972 the project had been operative for 21 months. In that time the service forester in charge had completed 29 woodland conservation reports covering 1,347 acres subject to development. These were submitted to the county with reports on soil limitations for urban development. The woodland reports covered retention of trees for green space acres, control of soil and water erosion, screening strips, air pollution control, noise abatement, recreation areas, and general aesthetics. Rezoning actions were based on these reports.

By using trees to be cleared, instead of burning them, the volume of residues to be disposed of by open pit burning was reduced,

which also helps reduce land-clearing costs. The service forester found an economic outlet for over 900,000 board feet of timber on a 119-acre land-clearing development. A small sawmill operation salvaged trees which would have been bulldozed and burned. The environmental benefits of this action are obvious.

Attention is now being given to developing stream valley acres of the watershed for recreation purposes. Fishing, picnicking, hiking and bike trails, nature trails, outdoor classroom sites, and small park areas are being considered.

FALCON Program Protects Environment

Supplying expanding demands for timber products and at the same time maintaining a high quality forest environment is the biggest single problem in American forestry today. A portion of this national concern is rooted in timber harvesting methods and associated road building activities. The Forest Service has developed a 10-year plan for a nationwide research and development program using balloons, helicopters, cable systems, and other log transport systems. It's called FALCON, the acronym for forestry, advanced logging, and conservation. When funds are appropriated, FALCON will begin in the Pacific Northwest and then move to the Nation's other commercial forest areas. An estimated 50 million acres of commercial forest land in the United States require special logging methods. FALCON promises better methods to salvage windthrown and fire-killed timber.

The Forest Service is actively engaged in programs aimed at a significant reduction of residues left following both logging operations and processing of the raw material at the mill. Part of this program involves improved and more precisely controlled procedures in timber and land management practices. An additional portion involves research and development to enable more efficient processing of raw material to minimize residue development, as well as procedures for economically using unavoidable wastes through the manufacture of usable products. Examples of these activities include:

1. Cooperative research with industry to develop the most efficient methods of harvesting timber and removing and treating unmerchantable forest residues. This permits forest managers to determine precise costs of various alternatives in post-harvest treatment.
2. The feasibility of onsite chipping of residues in the woods being investigated through a cooperative government and industry study. Further research to provide economic procedures for processing and transporting these materials is underway to determine procedures for separating bark from chips, and providing low-cost transport systems through pipelines.
3. Forest Service cooperation with industry and others to develop methods for manufacturing particleboards and fiberboards

that can use the entire tree, including bark. These products can substitute for plywood or be incorporated in building components as replacements for lumber.

4. Recycling wood and wood-based products into new products for reducing resource waste and associated pollution. A cooperative pilot study with the city of Madison, Wisconsin, and the Bureau of Mines is testing the feasibility of manufacturing paper, paper box, and structural products from wood and paper wastes mechanically separated from city trash.

Plan Protects Forest Environment

A 30-point action plan to improve the management of timber resources in the 155 National Forests was adopted by the Forest Service in 1972. Published under the title "National Forest Management in a Quality Environment—Action Plan," the plan deals with aesthetics of the forests, timber harvesting, regeneration practices, planning and administration of major forest actions, road construction, and research. The plan responds directly to the timber harvesting guidelines set forth by the U.S. Senate Subcommittee on Public Lands in its recent report "Clearcutting on Forest Lands."

Forest Fuel Management

In undisturbed forests, natural mortality and leaf fall accumulate excessive fuel beds, which become a serious fire hazard. In 1972, the Forest Service was given a $5 million appropriation to speed up fuel abatement, particularly in the Pacific Coast regions, where fuel buildup and fire occurrence is most severe. Fuel reduction work now underway is expected to employ approximately 600 people and will construct 500 miles of fuel breaks, reduce debris along 275 miles of forest roads, and convert flammable brush cover types on 20,000 acres with beneficial plant cover, including grasses suitable for forage for wildlife and domestic grazing stock.

Forests will be "fireproofed" and the environment improved through removal of unsightly debris.

Tree Planting Increases

Total planting and seeding increased slightly in fiscal 1972 to 268,105 acres. Natural regeneration occurred on 58,707 acres of prepared sites. Timber stand improvement increased to 368,629 acres treated in fiscal 1972.

For the Young

Through the Youth Conservation Corps, America's young people have been given a special opportunity to work with natural

resources on public lands, including National Forests, and gain an intimate understanding of environmental relationships. A 3-year pilot program was designed for young men and women, aged 15 through 18, from all social, economic, and racial classifications. By summer's end, 1972, 2 years' operation of the pilot program had been successfully completed; 1,857 youths were served in 47 camps or units within 36 States. Letters received from appreciative parents stress the fact that the attitude of the young adults toward natural resources has become far more constructive.

The Elderly

A 66-year-old retired employee from the Corps of Engineers found a stimulating experience in laying out foot and horse trails in the Ozark National Forest in Arkansas.

A 76-year-old rural resident of West Virginia has found profitable employment and personal satisfaction building fences, clearing brush, and policing recreation and camping areas in the Monongahela National Forest. The Departments of Labor and Agriculture in June completed an agreement whereby the Forest Service will serve as prime sponsor for a "Mainstream" program to employ elderly Americans in the outdoors. The program is designed to provide jobs for active older persons 55 years and over.

Credit for Clean-up

Program priorities for the Farmers Home Administration in 1972 centered on projects aimed at eliminating substandard housing, elimination of unsanitary water and dangerous sewage situations, and improvement of watersheds.

More than one half million rural Americans were able to move to new, modern housing in 1972, thanks to the rural housing loan program. About 116,000 families received individual loans, and 565 other borrowers built or improved 3,500 rental and farm labor housing units. Home financing under these programs totaled $1.6 billion.

Some 1,200 communities were able to build new water or waste disposal systems, or both, with FHA aid amounting to $300 million in loans and $40 million in grants. Another 155 counties and districts drew up comprehensive plans for new systems with the aid of $2.1 million in grant funds, and now can anticipate the day when old-fashioned systems will be replaced.

More than 900 loans were made to improve soil and water resources, irrigation, and drainage on farms, with more than $5.4 million involved. Another $8 million was invested in loans to improve watersheds, to carry out resource conservation and development projects, and to enable Indian tribes to make necessary improvements on their reservations.

Progress with improving our environment can only be made when all levels of government cooperate. The Cooperative Extension Service is the agency in the Department of Agriculture which makes this necessary cooperation possible. Some examples of this cooperation follow.

Environmental Improvements.—With land use legislation in Colorado requiring county commissioners to establish county planning commissions by July 1, 1972, the Extension Service field staff provided leadership in all of the nonmetropolitan counties engaged in meeting this legislative deadline. The Extension Service was assigned to the newly created Land Use Commission Task Force and conducted seminars throughout the State to explain the new legislation and to provide direct input from local citizens in developing the State land use plan, forming county planning commissions and direction for the emerging role of the Land Use Commission.

Oregon State University extended the services of several academic disciplines to Myrtle Creek, a small, rural community in southwestern Oregon, and developed a much-needed park plan. The park model is now on display in city hall and plans are being made for implementation.

Overcoming Environmental Degradation.—A major objective of the Extension Service is to reduce pollution from agricultural sources through the development and adoption of new techniques. The total obligation of Extension Service for environmental programs in 1973 in all areas is approximately $47 million.

The magnitude of this effort is illustrated by these examples: The California Extension Service has allocated 58 man-years of time to environmental improvement work; the Ohio Extension Service has received $4,000 from two industries to be used in eight counties for educational action programs in environmental improvement; and the Texas Extension Service has prepared an Environmental Quality Handbook as a reference and resource for county agents to answer questions from local citizens. State Extension Services have environmental specialists and programs, and some have environmental agents at the county or area level.

Solid waste disposal is being improved in many States by the "Green Box" collection system. This system, initiated in Alabama, involves locating sanitary containers throughout the collection area. Then, packer trucks empty the boxes and transport the material to the landfill. USDA specialists have helped communities plan and locate sanitary landfills.

In addition to the USDA Pest Management Program to reduce the amount of chemicals being introduced into the environment, USDA, SCS, and ES personnel have shown leadership in designing and explaining the "no-tillage" and "minimum tillage" crop production systems which reduce the sediment runoff into streams.

Extension homemakers in a Kentucky county organized a Clean-Up and Beautification Commission. Their big project was a countywide clean-up. The State highway department provided large plastic bags and the homemakers contacted citizens and local organizations to clean up their right-of-way. The trash was set along the roads and State trucks canvassed the county picking up trash—a first in the history of the county. Now the commission is working on a county dump or landfill project.

Extension homemakers in Indiana also sponsored a countywide clean-up campaign. They charted unsightly areas on a map and a committee with representatives from each township was selected to organize a campaign. As a result, rat-infested areas that had been neglected for years were cleaned up. More than 100 cars were recycled in about a month's time. It is estimated that at least 5,000 persons engaged in the special clean-up activities.

Livestock Feeders Meet Environmental Requirements.—Livestock wastes have been an environmental problem, but producers and feeders are redesigning their operations to meet State health regulations and environmental quality requirements.

For example, the Extension Service has provided leadership and funding for a six-State project on handling waste from cattle feedlots in the Great Plains area and a Midwest project centered in Iowa for handling wastes from swine, dairy and beef cattle. As a result of these two programs and research by universities, farmers and feedlot operators are rapidly adjusting operations to meet new requirements. Nebraska Extension specialists report that 75 feedlots have now completed waste management plans like the one being recommended.

It is estimated that 90 percent of the cattle feedlots in the Southern Great Plains now meet runoff requirements. The air pollution problem is more difficult to solve, but improved management and design is helping correct this problem.

Lagoons, oxidation techniques, irrigating with the liquid wastes, and other techniques are solving the animal waste problem. Slide sets, publications, and other educational materials from the two projects are now being used in many States. Tours were held in 1972 for farmers and Environmental Protection Agency personnel to see animal waste management on farms in Iowa.

An animal waste management system design conference is being planned by the Extension Service for 1973.

Much remains to challenge the Department of Agriculture in making our surroundings more comfortable, pleasant, and attractive, but this chapter indicates some of the progress which was made in 1972. Our farmers will continue to deserve the title of the Nation's "Number One Ecologist" as they make changes daily in their farming operation to bring the best from agriculture and the environment.

PROGRESS THROUGH RESEARCH

If present trends toward a more healthy agriculture are to continue, new and more efficient methods of production, processing, and distribution must be found. If the production methods of the past were being used on the farms of the United States today, we, too, would have trouble feeding our people, much less the millions of people who daily thrive on our food thousands of miles from our borders.

Two basic items separate our American agriculture from the production techniques in other lands. First, our system rewards efficiency. Ours is a profit system which returns to a man and his family the fruits of his production. Ours is a system that enables less than 5 percent of America's population to feed the other 95 percent. The Soviet Union, on the other hand, has nearly half of her people on farms and still cannot feed herself without massive purchases of farm goods from other nations.

The second basic item separating U.S. agriculture from that of other countries is the manner in which we in America apply our best scientific knowledge to the production of food. More than just the *production* of food, our application of science goes to developing new, tasty, attractive, efficient, and nutritious food items from the basic agricultural commodities.

One of American agriculture's greatest assets over the years has been the scientific research applied to getting more and better food from our land to the dinner tables of America and with enough left over to feed millions more around the world.

Research has come a long way for agriculture in America. The application of lime and phosphate to the soil has given way to such things as the elimination of animal pests through the use of electronic sterilization. Picking potato bugs of another age has resolved into monitoring disease in plants and pest movement with earth-orbiting satellites and high-flying aircraft.

Much of today's agricultural research is done right on America's farms with farmers, themselves, assuming the role of scientist for their own production pattern and agricultural enterprises. These eager and able rural businessmen-scientists are devising their own best methods for increased production on their farms.

Research from the Department of Agriculture centers on helping these production "scientists" reduce disease damage, market more effectively, and then develop new products and uses for the bountiful production which each year comes from America's farms.

To optimize the impact of agricultural research, an effective educational system is required. In this regard, the cooperative Federal-State-county extension concept has been disseminating research results at the grassroots level for more than half a century. Extension agents in nearly every county in the country use educational methods ranging from one-to-one contact to sophisticated mass media techniques to help farmers understand the latest research developments and adapt them for their own use.

COMMODITY RESEARCH BREAKTHROUGHS

Expanding Food with Vegetable Proteins

Although the main source of protein for our foods in the next decade will be from animals, vegetable proteins will be used more extensively. The search for new and less expensive proteins for upgrading diets, refinements in technology, and more emphasis on distribution and new markets are factors associated with the possible increased use of vegetable proteins.

Most of the vegetable protein will be used as extenders for processed meat items and it is estimated that by 1980 as much as 10 to 21 percent of the projected meat needed for processed items could be replaced by vegetable proteins. It is expected that soybeans will be the source of most vegetable protein used. To be successful as meat extenders, soy proteins require texturing that withstands cooking and processing. A major technical development has been texturing by cooking and extruding a mixture of soy flour, flavoring, and coloring into various size particles. This process is less expensive than previously used texturing methods. Vegetable proteins are presently being used in the school lunch program and will probably be used in other institutions operating with relatively fixed budgets.

Soybean research is just now coming of age. Most of the solid research input took place during the 1960's, and we hope to see research during this decade of the 1970's come up with new concepts, new ideas, and better varieties. We've seen corn yields increase more than 400 percent from the 20 bushels an acre in 1930 to 40 bushels an acre during the early 1950's to a national average of more than 90 bushels per acre at present. We know the contributions that research has made to this advance.

Over the same years, the improvement in soybean yields has been far more gradual, from about 15 bushels an acre in the 1930's to almost 30 today. Where and when a soybean yield breakthrough will occur, causing an upward spurt like that which resulted from corn hybridization, nobody can predict. Perhaps some of the answer will come from plant breeding.

Since January 1969, 17 improved varieties of soybeans have been released by the Agricultural Research Service through State

experiment stations. These will have higher yields and greater resistance to nematodes and disease. One is a newly discovered male-sterile line that could lead to hybrid varieties.

Looking farther ahead, it's not inconceivable that some day it may be possible for American scientists to seek higher yielding soybean strains from the People's Republic of China. Some of the varieties that have contributed most to our soybean plasm resources have come from China—it's been 40 years since we have obtained varieties from the original home of the soybean.

Peanut Quality

Research at the Georgia Agricultural Experiment Station is aimed at increasing utilization of peanuts by promotion of present products and by development of new or improved peanut products.

The research has shown that different varieties vary in protein content by as much as 30 percent and that there is about a two-fold difference between certain varieties for the limiting essential amino acids (lysine, methionine, isoleucine, and threonine).

Experimental evidence from studies at the Maine Agricultural Experiment Station shows that peanut protein can be improved with respect to certain amino acids, particularly lysine and threonine. When peanut butter, for example, is used with white bread in a sandwich, the deficiency is aggravated since both wheat gluten and peanut proteins are limiting in the same amino acids. The Maine researchers found that by adding skim milk powder to the peanut butter the amount of protein can be increased and the nutritional quality will be better balanced.

Dairy Product Consumption

Consumption and use patterns of selected fluid milk products for 2,068 households in the major cities of eight Western States were analyzed at the Washington Agricultural Experiment Station, along with consumer attitudes toward selected fluid milk products.

The data showed a sharp decline in per capita consumption of fluid milk by both sexes with the advent of adulthood. Nonwhite households have relatively low levels of fluid milk consumption. Fluid milk is considered a poor away-from-home beverage. Large families drink lesser per capita amounts of fluid milk products.

Whey as Human Food

The use of whey as a human food ingredient remains a major need of the dairy industry to improve economic returns and avoid the major pollution problem currently posed by whey disposal. Whey use research at the Ohio Agricultural Experiment Station has

centered on the production of food components derived from valuable proteins in whey. Storage characteristics of milks and beverages prepared from whey are also under investigation.

The addition of whey proteins to sterilized whipping cream produced a firmer body in the whipped product and improved its stability.

Other Research

Other research and education on specific agricultural commodities during 1972 included:

Cotton

A special 1-year appropriation of $500,000 earmarked for expanded work in cotton to increase production of quality cotton was initiated in 1972 in 14 cotton States with a joint release by the cotton industry leaders and the Secretary of Agriculture. Total cotton production was up 29.5 percent in 1972. The Extension Service took the leadership with educational programs to improve cotton harvesting and ginning with special emphasis on improved maintenance and adjustments of cotton harvesting machines, to improve ginning efficiency, and to aid the Nation's cotton ginners in adopting regulations for improved safety and health (OSHA) and State and national air pollution regulations.

Sheep

Eight model sheep management systems were developed with the Sheep Industry Development, Inc. (SID) and 6,400 copies of these outlines have been ordered. A "Sheep for Profit" symposium was held for over 230 sheep industry leaders and research personnel. Nine "Sheep for Profit Demonstrations" have been started with State livestock specialists and cooperating farmers.

Swine

USDA researchers, industry leaders, and land-grant universities cooperated to compile, publish, and distribute four research reviews and 20 fact sheets on swine health, housing, reproduction, and feed additives. The Extension Service has supplied leadership in national symposiums and demonstrations in dealing with the stress syndrome and the soft watery pork problem.

University of Minnesota pathologists report that diseased corn fed to young swine produces different effects, depending on the type of fungus in the corn. The Southern corn leaf blight fungus created no ill effect on the animals in the experiment. But pigs fed a ration for 64 days containing the fungus that causes kernel rot, stalk rot, seedling blight, and pink ear rot in corn caused swollen vulvas, enlarged nipples, and rectal disorder in all female animals.

A rare condition, malignant hyperthermia, causing death in humans during anaesthesia, has been discovered in hogs at Oklahoma State University. There is no known treatment for the rapid and usually fatal rise in body temperature which occurs in susceptible

humans and pigs. Research suggests that the enzyme CPK in serum may be an indicator of susceptibility. Tests already are in progress on methods to save afflicted individuals, in consultation with medical cooperators in Nebraska, Texas, and Canada. Benefits to the hog breeder, as well as human medicine, could result from the study.

Apples

The Extension Service worked with the Pennsylvania Horticultural Association in adapting the electronic data processing program for determining the cost of owning and operating farm machinery to apple production and harvesting equipment. A training film on advantages of "Roadside Marketing" was produced and made available to the States to use with apple growers.

Potatoes

USDA and university researchers are continually developing new varieties of potatoes with potential commercial use. In 1970, the Extension Service initiated a plan to have growers field test and evaluate these potential varieties. In 1972, six variety plantings of new potato varieties were made in eight Western States by 500 potato growers.

Well-Timed Irrigation

Efficient irrigation of corn and other crops requires proper scheduling and the application of the correct amount of water. Research at the Nebraska State Experiment Station has developed information on which to base recommendations as to correct timing and application of irrigation water to field corn for various soil conditions, including deep soils, claypan soils, and shallow sandy soils. Precise information on the rooting habits and the water requirements of the corn plant at various growth stages and the water-holding capacities of different soils is extremely useful to farmers. A 1-week delay in supplying irrigation water to corn can reduce the potential yield up to 34 bushels per acre under Nebraska conditions. On claypan soils too much water reduces yields.

At the Washington State Experiment Station, scientists found that irrigation after the time of tasseling of sweet corn growing on medium textured soil had little effect on yields. The critical time for irrigation was at and before tasseling. Two heavy applications during this period were nearly as effective for production as several more frequent applications. More frequent irrigations during the prebloom stage increased stalk height but had little effect on yield.

CONSTANT VIGILANCE FOR EFFECTIVE PROTECTION

New Micro-Organisms Found

For the second time in this century, a new class of disease-producing micro-organisms has been found. Scientists call

the infectious particles viroids. Their discovery can be compared to the discoveries of bacteria in the late 1800's and viruses in the first half of this century. The viroid was isolated by ARS plant pathologist, Theodor O. Diener, after 8 years of research on potato spindle tuber disease. The potato spindle tuber viroid is 80 times smaller than the smallest known virus, yet it can invade cells and disrupt their functions just as effectively as any virus. Knowledge of this additional micro-organism will open new paths of research into diseases that seem to be viral in nature but whose causes have up to now eluded scientists.

Genetic Engineering

Genetic engineering has achieved a male-producing strain of house flies that could reduce the cost and time required to separate flies by sex in insect sterilization programs.

Entomologists engineered the new strain by manipulating unusual genetic traits found on the same chromosome in two strains of dissimilar origins.

Scientists prefer to sterilize and release only males because females usually mate only once but the males mate many times. Previously, the only means of obtaining males for release required separating the sexes by mechanical devices or sexing by hand.

Detecting Aflatoxin

Discovery of a simple way to detect aflatoxin in corn has launched a farm-to-market mobilization of defenses against the toxic chemical sometimes produced by the mold *Aspergillus flavus*. In susceptible animals, aflatoxin can cause cancer.

The new method of detecting the mold, which can grow on a variety of feeds and foods, involves examining corn for green-gold fluorescence under ultraviolet light.

Another breakthrough in the fight against aflatoxin involves a method for inactivating the mold-produced chemical. If long-term feeding tests confirm chemical tests already completed, the new technique may be used to make contaminated agricultural products safe for animal rations.

Laboratory tests showed that treatment with ammonia under pressure effectively inactivates the toxic chemical in cottonseed and peanut meals. After treatment with ammonia, the contaminated meals had seven or fewer parts of aflatoxin per billion parts of meal, significantly below the safety guidelines set by the U.S. Food and Drug Administration. Nutritional quality of the meals treated with ammonia was reduced slightly, but proved adequate in rations fed laboratory rats for 90 days. Two-year feeding tests are now underway to determine whether the treated meals will cause any physiological changes in the rats.

A Shot in the Bark

A three-man research team in Ohio has developed a promising means for controlling vascular tree diseases, like Dutch elm disease, oak wilt, and verticillium wilt, or even curing diseased trees if the infection has not progressed too far. A new apparatus was designed to inject chemicals under pressure into the outermost annual rings of a tree, where vascular disease organisms are most active. The team also solubilized the fungicide, benomyl, which is highly effective against several vascular disease organisms. The solubilized fungicide can be injected in greater quantities and is transported more efficiently through the tree's vacular system. Environmentally, internal applications of fungicides eliminate the contamination of foliage sprays.

Disease Detection by Photography

The Tennessee State Experiment Station has studied aerial photographic techniques for detecting corn diseased by the maize dwarf mosaic virus. Diseased corn seedlings were detected on infrared film 3 days before mosaic symptoms were identified by ground observations. Virus diseased plants were not detected on conventional film until chlorosis or yellowing of the foliage occurred later in the season. Aerial photography reveals patterns of disease development and intensity which cannot be observed by other means. Additional research on these methodologies and techniques will probably make it possible to predict the development of the disease more rapidly and accurately, allowing control measures to be applied in an efficient and timely manner. Aerial detection will also become more valuable with use in monitoring these types of diseases.

Keeping Out Pests

Even the best of research cannot resolve the day-to-day crises that develop when diseases and pests threaten our animal and plant production capacity without the constant vigilance of Federal and State regulatory officials. In USDA, these regulatory programs were welded together during the year under a new agency, the Animal and Plant Health Inspection Service (APHIS). APHIS experts must effectively wear two hats at all times—one to keep potential pest problems from invading the United States, and the other to bring under control or eradicate pests and diseases already present.

Our agricultural economy could not successfully withstand the full impact of uncontrolled damage from insects, diseases, weeds, nematodes, rodents, and other pests. Producers could not remain competitive in the marketplace under these conditions. The excessive losses would disastrously reduce the quantity and quality of food, farm, and forest products available to consumers.

The first step in protecting the agricultural economy from pest damage is to keep out foreign animal and plant pests that might otherwise be brought into the country and add to current damages. This was a major responsibility during the past year because of the vast increase in foreign travel. The number of people crossing into the United States in 1972 was 235 million, far in excess of the entire population of this country, and commercial shipments of imported commodities are expanding.

During fiscal year 1972, agricultural quarantine inspectors at the Nation's air terminals scrutinized approximately 315,000 planes, more than 48 million pieces of luggage, more than 3,290,000 pieces of cargo and the processing of approximately 16,827,000 passengers.

In addition, nearly 71,000 ships with approximately 3,717,000 pieces of baggage were inspected and nearly 1,249,000 ships' passengers were processed. Mexican border activities included the inspection of about 39,321,000 vehicles, 8,109,000 pieces of baggage, and 65,000 railroad cars. Nearly 61 million packages of incoming mail were inspected.

As a result of these activities, a total of 40,621 plant pests of economic significance to agriculture were intercepted. Without this frontline barrier of inspection service, these pests could now be preying upon the agricultural economy.

A major threat to the success of these quarantine and inspection services is the number of tourists who attempt to sneak illegal souvenirs into the United States without realizing the potential threat to their own food supply, let alone our entire agricultural economy.

As just one example of the size of this problem, in a 3-day period this past year a USDA quarantine inspector at the San Juan, Puerto Rico, airport discovered illegal souvenirs in 43 of 400 handbags checked. The apparently innocent but potentially dangerous items included: 242 mangoes, three apples, seven plants in soil, 7 pounds of citrus leaves, and 15 pounds of sweetpotatoes.

Khapra Beetle Quarantine Lifted

An important milestone in 1972 was the lifting of the Federal quarantine for khapra beetle, the world's most destructive pest of stored products. The quarantine has been in effect since 1953 when the pest was discovered in this country.

USDA has now revoked the quarantine because inspection procedures and techniques have improved so the pests are being intercepted at our borders. During 1972 inspectors stopped khapra beetles from entering the United States 151 times.

Cereal Leaf Beetles and Gypsy Moths

The cereal leaf beetle and the gypsy moth are foreign pests that have taken a firm foothold in this country. The cereal leaf beetle

affects small grains. In Russia crop losses caused by this pest range from 25 to 50 percent. In Rumania, attacks have been so severe that the crop was plowed under because it was not economically practical to harvest.

Gypsy moth caterpillars eat leaves of trees. A heavy infestation can easily strip the foliage from an entire forest in a few days. A single defoliation may kill evergreens. Repeated defoliations will kill hardwood trees. The pest is defoliating about 2 million acres a year and still spreading.

In some other countries, natural parasites and predators are active in reducing damage from both these pests. Their natural enemies are not present in this country, and USDA plant protection programs are helping to establish parasite-rearing laboratories in 17 States infested with cereal leaf beetles, or infested with or threatened by gypsy moths. The objective is to stop these two pests by using biological controls. Parasites for biological control are not brought into the United States until USDA scientists have determined that they will not be harmful to man, animals, plants, beneficial insects, or any other part of the environment.

Sugarcane Root Borer

Pest control efforts were successful last year in significantly reducing damage to Florida citrus trees caused by the West Indian sugarcane root borer. The adult beetles feed on citrus leaves and the larvae attack the tree roots. A control program using pesticide treatments was started in 1968. For the first 3 years of the program approximately 1,600 trees were destroyed annually. In 1972, only 20 citrus trees had to be destroyed because of the pest.

Citrus Blackfly

The spread of citrus blackfly in the Rio Grande Valley of Texas during the year continued to be a serious threat to the citrus industry. Infestations of short duration can cut production by as much as 50 percent. If allowed to last longer than 1 year, they can cause complete crop failure.

In order to prevent this heavy damage, representatives of USDA agencies and the State of Texas have established an eradication plan in cooperation with officials in adjacent areas of Mexico. The plan calls for pesticide treatment of the total infested area, including a 3-mile buffer zone. A comprehensive research program is to be conducted to study the biology of the pest and to develop new and better control techniques.

Exotic Newcastle Disease

Programs to protect the agricultural economy from animal disease and pest losses were hard pressed by emergency outbreaks during the year.

A state of emergency was declared March 14, 1972, because of an outbreak of exotic Newcastle disease of poultry and other birds. The declaration makes funds available for emergency eradication measures. Spots of the disease were eradicated in Florida, Arizona, and in individual birds at other locations, but the center of the infection has been in southern California. Since the emergency eradication program was started there, almost 10 million birds have been destroyed. Total cost of the program by year's end was over $25 million. Though generally fatal to poultry and some other birds, exotic Newcastle is not harmful to consumers of poultry meat or eggs.

In addition to placing quarantines around infected areas, eradication measures included destruction of infected and exposed birds and complete disinfection of contaminated premises.

As a result of these and related efforts, by November 1972 the quarantine originally imposed on eight counties in southern California had been reduced from a territory encompassing 45,000 square miles to 2,300 square miles in parts of only three counties—a reduction of 95 percent. Incidence of the disease had also been dramatically reduced. Hopefully, the disease can be eradicated early in 1973.

New Hog Cholera Outbreaks

On October 11, 1972, another state of emergency was declared because of major outbreaks of hog cholera in the Midwest and Southeast. By mid-December, approximately 200 infected herds had been found during the year, compared with 118 in 1971. Before the hog cholera program started a decade ago, an estimated 5,000 to 6,000 herds were infected every year.

Eradication procedures employed by USDA and State veterinarians to bring the outbreaks under control included: (1) destruction of all infected and exposed swine herds, with indemnities paid to owners; (2) quarantines established on infected areas; (3) investigation and trace-back on all cases of hog cholera to locate and eliminate the source of the disease; and (4) enforcement of shipping rules and market regulations, including veterinary inspection at markets.

Achievements in Animal Disease Control

The seriousness of these disease and pest conditions has been of real concern to the livestock industry, but the alertness of livestock owners and State and Federal officials in detecting disease where it exists demonstrates a viable economic protection against uncontrolled losses.

Another example of achievement is the elimination of the sleeping sickness disease of horses, known as Venezuelan equine

encephalomyelitis (VEE), that rose to epidemic proportions in 1971. This disease—serious and frequently fatal to equines, and affecting man to a lesser degree—had spread from South America through Mexico and into this country. USDA coordinated a campaign with the cooperation of the Department of Defense and the Department of Health, Education, and Welfare and State agencies. Since VEE can be spread by mosquitoes, the campaign included a spray program covering over 13-½ million acres, as well as vaccination of 2.8 million horses and other equines in 19 States.

USDA watched carefully during the 1972 summer season, both in Mexico and the United States, to detect early any seasonal recurrence of the disease. Though VEE did move up from central Mexico along the west coast to the southern part of Sonora—where it reached epidemic proportions—Mexican officials brought the outbreak under control by mid-September.

No cases of the disease have been found in the United States since September 1971.

Another encouraging achievement is the successful testing of a system for identifying animals as they move through complex market channels from farm to slaughter. The livestock industry has suffered from the lack of an effective system for monitoring the animal disease and pest situation, so as to eradicate these threats before they can spread and become entrenched. An effective identification system would help to provide this surveillance.

The system tested on swine in 1972 is a slap-tattoo identification mark applied at market centers or slaughtering establishments. Through this identifying mark, diseased animals detected during post-mortem inspection can be quickly traced back to their herd of origin, and the sources of infection eradicated as rapidly as possible. The tests were conducted at four terminal livestock markets at a cost of 1 to 5 cents a hog.

If this system can be successfully applied to other market animals, the livestock industry could better protect itself against heavy losses from disease.

MARKETING EFFICIENCY AND PERFORMANCE

The Department of Agriculture seeks to encourage a food production and marketing system that performs efficiently and provides consumers a choice of food at lowest prices consistent with equitable returns to farmers and marketers. As an aid to making public policy decisions for achieving these goals, we continuously monitor and interpret margins, costs, productivity, and profits of food marketing firms. Two continuing statistical series, farm-retail price spreads for food and the food marketing bill, rank among the most used of the Federal economic indicators. During 1972, these economic data served as key parts of an early warning system for identifying food pricing irregularities and departures from price stabilization goals of the Price Commission.

Food Retailing in Urban Low-Income Areas

Concerns have been expressed that residents of low-income urban areas do not have full access to the same variety of quality low-cost foods offered in more prosperous localities. Efforts are being made, therefore, to determine the availability of retail food services and how well they are serving consumer needs. A study relating to food retailing in low and higher income areas of Cleveland, Ohio, found that the number of food stores was more than adequate to meet consumer demand in both areas, but supermarkets tended to be concentrated near the outer boundaries of the low-income areas. Residents of low-income areas tended to be less mobile than those in higher income areas. As a result, low-income consumers are more likely to find it necessary to patronize small neighborhood stores where food prices tend to be higher, and quality of products and level of services lower. Further analysis of the data is being made to identify alternative marketing practices or systems which offer the greatest potential for improving the food service of inner-city, low-income consumers.

Unit Pricing in Supermarkets

Consumers are asking for a clearer statement of price in the supermarket.

Cornell University scientists recently completed a study on the usefulness and costs of providing unit pricing in supermarkets. It showed that aggregate consumer savings would not be affected appreciably, and that the costs of the service were apparently lower than expected. Consumers generally reacted positively to unit pricing.

In formulating some implications for public policy the researchers concluded that although the initial effects of required unit price information would likely be small, it would increase and justify confidence in the industry.

A recent Pennsylvania State University survey of consumers has revealed: consumers are more critical about grocery products than any other category; 69 percent favor unit pricing and 54 percent favor open dating and nutritional labeling even if it raises the cost; 81 percent strongly favored Government enforcement of truth-in-advertising; most consumers want more protection on food safety and reliability; writing to the manufacturer and talking to the store manager were regarded as the two most effective techniques for action.

OTHER RESEARCH FOR NEW PRODUCTS AND USES

New Feed Formulations

Processed Douglas fir used as an energy source in a fattening ration for steers has produced average daily gains of 2.7 pounds and

2.99 pounds in tests at the Washington State Agricultural Experiment Station. The wood has been processed to get the indigestible lignin out and to expand the cellulose molecule so enzymes can digest it. The final product looks like shredded beet pulp or finely cut silage. Minerals and vitamins were added to meet the animals' requirements.

Digested Cellulose

Byproducts from production and processing of agricultural food and feedstuffs can become either another waste to be disposed of or a valuable asset to be recycled.

Digested cellulose is needed by dairy cows as a source of acetic acid for milk and milk fat formation. In 1968, the Georgia State Experiment Station began looking at soybean hulls in fistulated steers and found them to be an excellent source of highly digested cellulose. The research revealed that when pelleted, the soybean mill feed yielded even more acetic acid. Another potential waste disposal problem has become an economic asset through agricultural research.

Range Improvement

With the strong cooperation of permittee ranchers, new and improved grazing systems have been installed on thousands of acres of National Forest System lands. As a result, once deteriorating range conditions are now improving. Watershed conditions have improved and many forms of wildlife have benefited. In many instances the numbers of permitted livestock could be safely increased.

On one forest in Montana, for example, eight allotments, totaling some 160,000 acres and grazed by 3,250 cattle for 3-½ months, were considered overstocked. Reductions averaging at least 38 percent were believed necessary to reverse downward trends of range conditions and to restore their productivity. After a thorough analysis of the resources, improved grazing management plans were designed specifically for each allotment and implemented in 1963 and 1964.

The plans, jointly prepared by the ranchers and the Forest Service, required additional fences, water developments, some sagebrush control, and implementation of improved grazing systems which provided for prescribed rest and grazing in the proper sequence and time of year. In 1972, the results were spectacular.

	From	*To*
Carrying capacity	8,255 animal unit months	16,443 AUM's
Stocking	11,373 AUM's with a planned reduction of 38 percent	13,762 AUM's, an increase of 21 percent
Elk winter feed	Chronic shortage leading to high winter mortality	Abundance of feed, virtually no winter mortality
Watersheds	Decreasing ground cover leading to deterioration	Increased ground cover leading to improvement
Conflicts with other severe uses and resources		Reduced or eliminated

Fighting a Thorny Problem

Virginia Polytechnic Institute research with German weevils in Pulaski County shows promise of another weapon against weeds, specifically thistles in pastures. Two types of weevils are under study. The larva of one finds the underside of the thistle head to its liking and does a thorough job of chewing there, causing the seeds in the head to abort. Another weevil prefers the roots of the plant, speeding up the process of destruction of the thistles. The weevils increase relatively quickly at the rate of 1,000 to 1 within 2 years.

Forest Products Use Stepped Up

Wood waste is being reduced at all levels of production. A program is underway which seeks to extend the Nation's timber supply by providing technical assistance to woodland owners, loggers, processors, and users of wood products.

Fifty-four Forest Service research projects are now in progress that relate directly to wood utilization and marketing. Plans are being made to start a new action program called "Project STEP" (softwood timber extension project). It is oriented toward putting more softwood lumber on the market through application of technological improvements. Efforts will be directed to diverting sawtimber material now going into pulp chips to lumber and plywood.

Assistance through Project STEP would be provided to mills sawing at least 2 million board feet per year. Such assistance could increase recovery by as much as 400 million board feet per year.

Press-Lam System

Timber supply will be extended through a new pallet manufacturing technique developed by the Forest Products Laboratory at Madison, Wisconsin. Much low-quality hardwood timber, particularly oak, has limited utility—even for pallets. The laboratory has developed a completely new system for using very low-grade timber to make superior pallets. The system incorporates knife cutting, rather than sawing, drying in a press, rather than in a kiln, and then laminating several pieces together with an adhesive to form pallet parts. Wood yield is increased by eliminating saw kerf, greater strength results from defect dispersion, and pallet performance is improved. Laminated lumber can be produced in as little as 15 minutes, from log to finished product. Low-grade logs can be used and their yield is increased. The concept offers possibilities for production of other products, such as framing lumber for houses.

BOF: More Lumber Per Log

BOF—an acronym for "best opening face"—is a new lumber sawing technique. It refers to the placement of the first or opening lumber cut on a log as it passes through the headsaw. The new method offers the potential of extracting up to 10 percent more lumber, on the average, from the smaller second-growth timber coming to sawmills in nearly all regions. As demands for housing lumber increase, the extra yields become important. Computations show that where the BOF system is used it can mean an average yield difference of 20 percent for most sawmilling methods.

House Rests on Wood

A recently developed all-weather wood foundation placed directly on gravel-covered ground helps home builders overcome seasonality problems and increases livability in basement areas. The foundation system is fabricated with softwood lumber and plywood, pressure treated according to standards prescribed by the American Wood Preservers Institute. The Forest Service participated in basic research.

The pressure-treated wood foundation panels are set in trenches lined with crushed rock to provide drainage away from the foundation. The panels are delivered ready for installation without any on-the-site preparation. They can be placed on the ground during rainy weather, which is not possible with masonry foundations. The modular or other type of housing unit can then be set in place on the foundation with a crane, bolted in place, electricity and sewage connected, and be ready for occupancy by evening. The system is lower in cost than the concrete block system.

Blizzard Wizard Tames Snowdrifts

In Wyoming, applied research has curbed blowing snows, improved driving safety, increased road visibility, and drastically reduced road maintenance costs on an important section of a cross-State highway. Credit for this environmental breakthrough is due to research on the snow controlling capacity of various designs of snow fence systems. Basic data came from a sophisticated "blowing snow" gauge. It measures the amount of snow going through the air at any given time. Other instrumentation indicated temperature, wind direction, relative humidity, and solar radiation. The combined information led to the design and construction of 8.5 miles of snow fence systems by the State Highway Department. Fence heights, slat spacing, and fence direction were tailored to trap specific volumes of snow as recorded by instruments at given sites.

Artificial or live snow fences on watersheds can be placed accurately to trap and hold snow for more efficient delivery of melt water to benefit downstream irrigation areas.

Economic Impacts of Pollution Control

Compliance with stringent Federal and State control standards for pollution control could have an adverse effect on rural America. The most immediate impact of compliance could be the possible loss of jobs caused by the closing of agricultural processing firms that are too small to stand the costs of installing new pollution control systems. Since many of these small firms are located in rural areas, the loss of their payrolls could seriously impair current efforts to revitalize economic opportunity in rural America.

In the past year, a strong concerted research effort has been directed toward determining the economic impacts of pollution control standards on agricultural processing firms. This timely program is enabling decision-makers in the public and private sectors to better understand the economic consequences of pollution control in rural areas. Research studies are underway that are developing facts concerning the adverse effect of pollution control costs on the viability of individual processing firms. These economic impact studies cover the following agricultural processing industries—dairy, poultry, tomato, peach, cane sugar, cotton, and grain. Another integral part of this research effort is evaluating the economic feasbility of new technologies designed to minimize the cost impact of new pollution control systems and thus save jobs and perhaps expand employment opportunities in rural areas.

Remote Sensing

The Statistical Reporting Service, the Department of Agriculture's primary data collection agency, is engaged in research under contract with the National Aeronautics and Space

Administration to study the potential of satellite imagery in improving crop and livestock estimates. Before the launching of ERTS-1 in July 1972, study sites were selected in several midwestern States to represent a variety of crops and growing conditions. Within the study areas "ground truth" data were obtained by personal visits in May 1972 and on a monthly basis from August through October. In addition to satellite data and ground data, the sites were photographed from high-flying aircraft. All three sources of data are being evaluated as a means of providing better crop forecasts and estimates.

AGRIS: An International Information System

The growth of agricultural literature in recent years has been such that only a sustained and systematic effort, based on international cooperation, can ensure the proper processing and dissemination of this knowledge for the benefit of all potential users. The National Agricultural Library has cooperated with the Food and Agriculture Organization of the United Nations (FAO) in the development of a worldwide information system for agriculture. AGRIS will be organized on two levels:

- AGRIS Level One: a comprehensive and rapid documentation service providing a current awareness in all fields of FAO's responsibility.
- AGRIS Level Two: a network of specialized services, some of them already existing, which should include specialized information centers, analysis centers, and data banks, with responsibility in depth for particular subject fields, providing retrospective information through abstracts, deep indexing, and other forms of service to users.

This information system is planned to be a cooperative one, in which all countries will be called on to make contributions in the form of current information on their documentary production. In return, all countries—and in turn, their information or documentation services, and their users—will benefit from the pool of information thus created.

NEW HORIZONS

There is much unfinished work to be done. The United States is still a young, vigorous, and growing Nation. By the end of the century, just a generation away, we might have close to 100 million more people living in the United States—a 50-percent increase in 28 years.

During the past 25 years, the per capita real income of Americans—after taxes and inflation—increased by about 50 percent. Predictions are that the increase in real income will be considerably greater during the coming quarter century.

By the year 2000, we must rebuild old America as well as build a new America. We must build new cities, whole new transportation systems, and new homes for millions more people. Some say that total new construction by 2000 will be at least as great as the total construction of all kinds now existent. Most of us simply cannot comprehend what this means in terms of the need for more skilled workers, service trades, manufacturing, recreation, and opportunities in a broad spectrum of fields of productive activity.

The economic stirrings we are now observing are but the surface evidences of mighty forces. In this decade of the 1970's and the years that follow, the volume of new factory construction will be hard pressed to keep up with building demands generated by new markets, new products, new production techniques, obsolete work and product flow arrangements, and new customer services.

Moreover, the people who man the production and service industries will be younger, healthier, and more demanding with regard to the foods they eat. In this decade, 50 percent more people will reach age 21 than in the decade of the 1960's. We're going to have at least 40 percent more net new households this decade than last.

Progress on the farms of the Nation has been impressive. We have witnessed record net farm income, record agricultural exports, the decline in farm numbers has been cut by 60 percent, farmers are making more of their own management decisions and participating in Federal farm programs in record numbers.

But there is still much to be done.

Farm income needs to be strengthened further, so that farmers have a fair return on both their investment and their labor. It doesn't make sense that the average disposable income of farm people is still amost 20 percent smaller than the average income of nonfarm people, especially when farmers have an average of more than $100,000 in capital assets per farm.

We must work harder to get fair treatment of U.S. farm exports in Western European markets—and continue to work diligently to open further trade with Eastern European markets, building on the record grain sale that was made to Russia last summer.

We must continue to ease down the inflationary rises in costs that hit farmers doubly hard by cutting farm net incomes and by raising farm family living costs.

We must continue to build the right kind of rural development programs—innovative programs that will bring more of the Nation's economic growth to the rural areas; sound programs that will encourage local investment and create permanent jobs; and sensible programs that will strengthen the farm economy and allow more farmers to find opportunities for financial success and a good living on the land.

And with a changing farm market mechanism where fewer farm prices are determined in competitive central markets and more farm prices are determined in advance contracts with processors, we must provide farmers with a seat of equal strength and equal dignity at the bargaining table.

At a time when only one American out of 21 is a farmer, there may be those who think that the role of the farmer is diminishing. Nothing could be farther from the truth. The fact that so few farmers can feed so many—and so well—at such a reduced portion of consumer's income—is the greatest economic success story in today's world. The productivity of the American farmer is a modern miracle; it is the envy of other nations, friend and for alike; and it is a vital ingredient in the success and affluence of this country, which no other land, and no other people, can match.

And agriculture will be even more vital in the years ahead. Farming will be even more important to the economy when the livelihood of an additional 100 million people will depend on the productive genius of so few farmers to provide food and raw materials.

Agriculture's productivity per man-hour, which is increasing at twice the rate of manufacturing industries, will become even more vital to anti-inflation measures where food and food prices are such an emotional issue.

Agriculture will continue to become more essential to the strength of the dollar as record U.S. farm exports contribute a favorable balance of trade.

U.S. agriculture will become even more meaningful to international peace as the worldwide struggle for food intensifies in lands where people are increasing faster than the food supply. At a time when the quest for food will mean so much to the tranquility and internal stability of nations, we own the world's largest food producing capacity—measured in land, in climate, in farming know-how, in research, and in an information delivery service.

Rural areas will contribute even more to our national well-being as national economic growth rebounds from the centers of compacted population. This compaction has squeezed 75 percent of

our population onto less than 2 percent of our land in a kind of living which violates the environment, breeds discontent, stifles pride, deteriorates society, and hampers economic production. We will see this Nation turn to rural areas for elbow room, open space, clear air, clean water, beauty, tranquility, and security.

About a fifth of our land in the 50 States is in cropland, a fourth in grassland pasture and range, a third in forest, and an eighth in wasteland. These are the same proportions as existed in 1950. Urban uses take only about 1-½ percent of the land, and transportation only 1 percent. Recreational, wildlife, and other extensive special uses account for about 5 percent.

Because of improved technology and increased use of capital inputs, output per acre of cropland increased about 60 percent from 1950 to 1971. Population increased 35 percent but total agricultural output increased 52 percent, so that we were more than able to meet the increased demands for food and fiber.

Major land use patterns are expected to change very little by the year 2000. Based on fairly conservative assumptions of productivity and needs, we will require only a 7-percent increase in cropland and pasture over the base year 1965.

The population of the 48 contiguous States increased some 23.7 million people from 1960 to 1970. Most of the increase (20 million) occurred in counties located within Standard Metropolitan Statistical Areas (SMSA's)—those counties in or near a city (or cities) totaling 50,000 or more people, plus the economically integrated surrounding counties.

In 1970, SMSA's had a total land area of about 248 million acres—about 13 percent of the total in the 48 States. These areas now have about 70 percent of the people but only an eighth of the land. We still find a considerable amount of agriculture and much open space in these SMSA's. People occupy only 10 percent of the SMSA land. The rest is in cropland (24 percent), pasture (19 percent), woodland (32 percent), and other uses (15 percent).

The rural portions of the SMSA's make up the transitional zone for land use changes greatly affecting the quality of our life. The problem is not a shortage of land but the need for effective land use planning and control to avoid haphazard urban sprawl and resulting land use conflicts.

Per capita consumption of beef has been increasing. If this trend continues, feed crops are expected to occupy an increasing share of the acreage in crops, and food crops will tend to decrease their share.

Animal production results in 2 billion tons of waste annually; a third of this is liquid. When farms held small numbers of livestock and agriculture was more widely dispersed, animal waste was a minor problem; it was returned to the land as fertilizer. An increasing proportion of these wastes now comes from large cattle feedlots and poultry operations. Solutions to this problem are needed as soon as possible.

American agriculture remains the production envy of the world. This is quite the reverse from the centuries-old problem where most nations cannot produce enough food.

Americans should be thankful for the opportunity to live in a land of abundance. Our efficient farmers provide the basis for this abundance. They make it possible for more than 95 percent of our people to be free from the job of producing food. As a result our people are free to produce the luxuries which most of us take for granted but are often not available at any price in many of the lands of the world.

Agriculture is the first of the sciences. It is basic to our prosperous Nation. The 95 percent of our people who do not produce food might well be reminded, from time to time, that the tasty, nutritious, and economic foods they purchase for less of their take-home pay than anywhere else in the world all get their start on an American farm.